The Builder.

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ILLUSTRATIONS.

New City Hall, Belfast ..... Mr. A. Brumwell Thomas, Architect.

Sketches with the Architectural Association Excursion:—
Bede House, Lyddington.
The Courtyard, Kirby Hall.
Sketches at Northborough, Stibbington, Stamford, etc. ..... Sketched by Mr. W. Curtis Green.

Illustrations in Text.

Some Further Notes on Asphalt:—
Fig. 1 ..... Page 230

New City Hall, Belfast. Plans. Mr. A. Brumwell Thomas, Architect ..... Pages 234-35

Illustrations to Student's Column:—
Figs. 20 to 28 ..... Page 237

CONTENTS.

	PAGE
Brickwork Tests	221
Light and Air	223
Notes	224
The Architectural Association Annual Excursion	226
Magazines and Reviews	228
Some Further Notes on Asphalt	230
Macadamised Roads and Dust	232
Building Dangers	233
The Royal Sanitary Institute	233
Correspondence:—	
Old Surrey Churches	233
Redness of Water from Hot-Water Service	233
St. Nicholas, Guildford	233
Books Received	233
Illustrations:—	
Belfast City Hall	233
Sketches with the Architectural Association Excursion	233
Trade Catalogues	236
The Student's Column	236
London Building Act Tribunal of Appeal	237
Obituary	238
General Building News	238
Stained Glass and Decoration	239
Sanitary and Engineering News	239
Foreign	240
Miscellaneous	240
Legal:—	
Action by Architects for Fees	241
Point under the London Building Act, 1894	241
Strand Building Dispute	241
List of Competitions, Contracts, etc.	242
Patents	245
Meeting	246
Some Recent Sales	246
Prices Current	246
Tenders	247

Brickwork Tests.

No materials employed in building construction are more familiar than bricks and mortar, and yet there are few whose physical properties have been less studied. The lack of reliable data as to the strength of brickwork is even more marked. To some extent these anomalies are readily explained.

The strength of bricks depends upon the chemical composition of the clay from which they are made, upon the preparation of the clay, and upon the extent of the changes effected by the process of burning. Thus, pure clays contract considerably in burning and do not vitrify, with the result that the bricks are not durable. Sand has the effect of reducing contraction and of promoting vitrification. Oxide of iron is a useful constituent which by acting as a flux encourages fusion of the silica, and gives hardness and strength to the product. Sulphate of lime by rendering the clay too fusible leads to distortion in the kiln, and carbonate of lime being decomposed yields quicklime which, becoming slaked by the absorption of moisture, causes partial disintegration. Free silica is beneficial in moderate quantities, but in excessive proportions renders bricks brittle. In addition to the effects of different constituents, the processes of manufacture have an important bearing upon the strength of bricks, and the influence of burning is so variable that differences up to 100 per cent. may exist between two samples taken from the same kiln.

Sufficient experiments have been made to indicate the compressive strength of the principal varieties of brick, but only in a general way. The lack of more definite information than that available may be attributed in great measure to the fact that, so far as concerns the bulk of the brick buildings erected in London and the chief centres of population in Great Britain, architects have no occasion to calculate the strength of the chief material used. Building regulations provide for certain thicknesses of brickwork, and the weakest bricks afford ample strength. This may account for the feeble interest displayed with regard to brick tests. It is true that bricks are used to some extent in engineering structures to which stereotyped laws do not apply. For such works data are certainly necessary, and are usually obtained by the designer for the particular description of brick which it is intended to employ.

Again, mortar is looked upon as a material intended merely to keep the bricks in place, and not to impart transverse strength to the construction. Moreover, lime mortar hardens so slowly that interior portions not exposed to the air may not set for many years. Consequently little or no demand has arisen for data concerning the strength of mortar used in ordinary building construction.

Reliable information as to the strength of brickwork is still more lacking than data relative to its constituent parts. The extent of the knowledge to be extracted from Rankine's "Civil Engineering" is represented by this sentence: "A *small pillar of brickwork*, made of bricks of this quality laid in cement, should require from 800 to 1,000 lb. on the square inch to crush it." By "this quality" is meant bricks which, when set on end in a hydraulic press, cannot be crushed under a smaller pressure than 1,100 lb. per square inch. Thus, according to Rankine, a pier built of bricks having the ultimate crushing strength of 71 tons per square foot should not fail under loads less than from 51 tons to 64 tons per square foot. This implies that the strength of a brick pier in terms of the strength of a single brick is represented by a ratio ranging from 0·72 to 0·9. But as the strength of brick tested in its normal position is about twice as much as when tested on end, the ratio ought to be stated at between 0·36 and 0·45 approximately. Rankine's information does not extend to brickwork in lime mortar, and his statements are altogether too vague to be of the least practical use.

Results obtained by Dr. Böhme on brick cubes 10 in. by 10 in. by 9·5 in. are summarised in Professor Unwin's work on "The Testing of Materials of Construction." Two kinds of brick were chosen for these experiments:—Beneckendorfer brick, with the crushing strength of 263·2 tons per square foot, and Hertzfelder brick, with the crushing strength of 160·9 tons per square foot.

The records are of little use except to throw light upon the influence of different mixtures of mortar upon the strength ratio of brickwork to single bricks. Taking the highest and lowest figures, the ratios were 0·64 for 1 : 3 cement mortar, and 0·44 for 1 : 2 lime mortar.

From an interesting series of tests conducted at the School of Practical Science, Toronto, on brick piers about 2 ft. high by 9 in. square, we select the above results for comparison. The strengths of the mortars were :—Lime mortar (1 part of lime to 2 parts of sand) 65 lb. per square inch, and cement mortar (1 part of Portland cement to 3 parts of sand) 1,352 lb. per square inch, the age of the mortar and piers being 10-11 weeks.

Some tests conducted at Watertown Arsenal * upon brick piers, 12 in. square, and from 1 ft. 4 in. to 10 ft. high, afford more striking testimony as to the vagaries of experimental results. From these records we quote the following as most applicable in this country :—

Mortar.	Ultimate Strength of the Pier.	Compressive Strength of the Mortar.	Mean Ratio of Strength, Pier to Brick.
	Tons per sq. ft.	Tons per sq. ft.	
Lime 1, Sand 3	97	0·8	0·101
Lime 1, Sand 3, Cement 0·5	91	1·23	0·094
Cement 1, Sand 2	164	3·3	0·170
Neat Cement	153	2·24	0·158

It should be remarked that the very small values of the ratio of strength is due to the fact that the average crushing strength of the bricks, tested flat, was nearly 965 tons per square foot. Notwithstanding the inconsistency of the relations between the strength of the brickwork and the mortar in the Watertown tests, it is clear from the two proceeding sets of results that the strength of brickwork depends mainly upon the strength of the mortar. This is also shown by a series of tests conducted at Watertown Arsenal by the American Society of Civil Engineers in 1887-8. The investigation was made upon piers of various dimensions built of different qualities of brick, some laid in 1 : 3 lime mortar, and others in cement mortar of different proportions. Examination of the results shows that the piers built with cement mortar possessed an average strength equal to about 1½ times that of the piers built with lime mortar. For a useful summary of the results the reader is referred to the "Report on Brickwork Tests," recently issued by the Royal Institute of British Architects.†

We have reserved mention of this valuable publication until the present stage with the object of showing how great was the want for reliable and consistent information as to the strength of brickwork. Many of our readers have already had the opportunity of studying the report in the *Transactions* of the Institute.

The inquiry was undertaken by a sub-committee of the Science Standing Committee in the year 1893. Three series of tests were conducted, the first two upon thirty-eight piers all 6 ft. high by 18 in. square, and the third upon twenty lengths of brick walling 6 ft. high by 27 in. long by 18 in. thick.

The materials employed in the first and second series are given below, together with the strength of the bricks and mortar. It should be stated that the mortars tested were made with "Standard" sand, and not with the sand used in building the piers. When made with the latter the strengths would probably not be more than half the values given below :—

Brick.	Average Crushing Strength.		Ratio of Strength Pier to Brick.	
	Lime Mortar.	Cement Mortar.	Lime Mortar.	Cement Mortar.
	Tons per square foot.	Tons per square foot.		
Yorkville 1st	36·6	76·5	0·121	0·253
Yorkville 2nd	24·2	73·3	0·141	0·366
Humber 2nd	21·0	81·4	0·177	0·684
Kingston road 2nd	30·7	61·3	0·278	0·568
Carleton Clinker	43·8	173·4	0·121	0·476

These figures demonstrate the advantage of the stronger cement, but not in a uniform manner. Even in comparing the ratios on lines 1 and 3 of the table with the relative resistance of lime and cement mortar, it is evident that the increased strength due to cement mortar is far from being proportionate to the higher crushing strength of that material when tested separately.

The explanation is to be found in the behaviour of the piers while under compression. We are told in the Report that the successively developed evidences of strain were internal cracking sounds, the squeezing of mortar from joints, the cracking of single bricks under unequal strains, the appearance of cracks indicating final lines of rupture, bulging of the brickwork, and, finally, collapse of the structure. The same phenomena were exhibited in both Series I. and II., and it was remarked that the vertical line of joints formed by the closers was always a plane of weakness where serious cracks first showed themselves. The result given by the pier built with dry sand shows that it carried 15 tons per square foot, or approximately half as much as other piers laid in lime mortar which had been allowed to harden for about twenty-two weeks and forty-six weeks. Examination of the diagram representing this experiment gives a clue to the manner in which brickwork is likely to fail if exposed to additional loads after the cohesion of the mortar has been destroyed.

The Staffordshire bricks were so strong that they could not be crushed in the testing machine available. Consequently they were cut in half and tested as half bricks. We cannot see any reason why the same course should not have been followed in the case of Leicester red bricks, and it is to be regretted that the actual strength of these was not determined. As a separate series of tests suggested that the resistance per square foot of whole bricks was about one-third more than that of half bricks, we have inserted values on this basis in the foregoing table.

The piers were built in 1895 for the first two series of tests, sixteen piers for Series I. and sixteen piers for Series II. Owing to the fact that the bricklayers substituted London stocks as closers in the Leicester red and Staffordshire blue brick piers, some piers in the first set were rendered practically useless. Hence six duplicates, constituting Series Ia, were built and tested with the piers of Series II. Subsequently, at the suggestion of Professor Unwin, a pier was built of bricks simply laid in sand.

Those piers tested in the first series had the average age of about nineteen weeks; in the second series proper they were about forty-five weeks old, in Series Ia nearly thirteen weeks old, and the pier in sand was crushed during the day on which it was built.

Summarising the results of Series I. and II. for comparison with those previously quoted in this article, we have the following record, the ratio of strength being calculated for whole, and not for half bricks as in the Report :—

Brick.	Mean Crushing Strength.		Ratio of Strength, Pier to Brick.	
	Lime Mortar.	Cement Mortar.	Lime Mortar.	Cement Mortar.
	Tons per square foot.	Tons per square foot.		
London Stock	11·83	17·29	0·14	0·20
Gault	21·76	23·88	0·12	0·13
Leicester Red	32·43	54·45	0·06	0·10
Staffordshire Blue	73·98	77·64	0·08	0·08

Brick.	Mean Crushing Strength.		
	Brick.	Lime Mortar 1 : 2. Age, 24 weeks.	Cement Mortar 1 : 4. Age, 24 weeks.
	Tons per square foot.	Tons per square foot.	Tons per square foot.
London Stock	84·27	15·72	56·15
Gault	182·2		
Leicester Red (half brick)	382·1		
Leicester Red (whole brick)	509·0		
Staffordshire Blue (half brick)	701·1		
Staffordshire Blue (whole brick)	935·0		

* "Report on Tests Watertown Arsenal, U.S.A., 1883-4," pp. 69-122.

† "Report on Brickwork Tests." London: The Royal Institute of British Architects. 1905.

and Staffordshire blue bricks were used, the average crushing strengths being 220·85 tons and 779·6 tons per square foot respectively. As the Staffordshire bricks could not be tested whole, the actual crushing strength was probably about 1,040 tons per square foot. No comparative tests of the lime and cement mortar are published, a rather unfortunate omission.

The elements of uncertainty mentioned above clearly take away some of the value from the third series of tests. It should be noted that the brickwork, being built with a wall bond, was free from the vertical joint occurring at the angles of the 18-in. piers, and that all the specimens were about twenty-two weeks old at the time of test. The following table gives the average results, and the ratios of strength calculated for whole bricks as before :—

Brick.	Average Crushing Strength.		Ratio of Strength, Pier to Brick.	
	Lime Mortar.	Cement Mortar.	Lime Mortar.	Cement Mortar.
	Tons per square foot.	Tons per square foot.		
London Stock	18·64	39·29	0·22	0·47
Fletton	30·68	56·25	0·14	0·28
Gault	31·14	51·34	0·17	0·28
Leicester Red	45·36	83·36	0·09	0·16
Staffordshire Blue	114·34	135·13	0·12	0·14

While the report contains much valuable information, and most interesting details concerning the mode in which the failure of the different piers and wall sections occurred, the records are not so complete in some respects as could be desired.

Being dependent upon the generosity of Sir William Arrol for the 100-ton testing machine lent for the purposes of the investigation, the Committee cannot be blamed for the circumstance that some of the bricks could not be tested whole. Scientific bodies in the United States are far more favoured in this respect than our own institutions, for they have the privilege of using the 500-ton testing machine at Watertown Arsenal—one more evidence of the intelligent interest taken by the United States Government in scientific research.

There could not be any valid reason, however, for the omission to prepare samples of the lime and cement mortar with the sand actually employed in building the piers. It is said in the Report that "the quantity of sand was not sufficient for making more than a few briquettes, and therefore it was decided to use for most of the briquettes the standard washed and sifted sand which has been generally adopted for cement tests, and which is obtained from Leighton Buzzard." Sand is not a very expensive commodity, and the neglect to furnish it in sufficient quantity for the mortar tests could only arise from want of forethought. The result is that no direct comparison can be made of the strength of the piers in terms of the strength of the mortar.

A still more serious fault is that arising from the inefficient supervision exercised over the work of the bricklayers employed to build the first and second series of piers. As we have already pointed out, six of the piers were rendered practically useless by the reprehensible action of the workmen, and there is good reason for inferring that the accuracy of the remaining results was appreciably affected by variations of workmanship.

The walls of Series III., and the six substituted piers, constituting Series IA, were built under the direction of a competent clerk of works, who certainly ought to have been engaged at the start. As this somewhat obvious precaution was neglected, the original intention of the committee has not been fully realised. The objects, as we understand them were (1) to obtain figures representing the strength of piers each built of a specified variety of brick, with a uniform quality of workmanship and tested in two groups at the ages of twenty-two weeks and forty-six weeks respectively; and (2) to make comparison of the values with those obtained from similar piers built with a wall bond instead of the usual pier bond. These objects have been defeated in some measure by the introduction of London stock closers into the Leicestershire red and Staffordshire blue brick piers, and probably by variations of workmanship among the piers of Series I. and II. Even if such variation did not take place, the quality of workmanship in Series I. and II. as a whole differed very much from the workmanship of Series III., and it must also be remembered that some of the bricks used for the last series were of different quality from those in the two previous series. Hence discrepancies arose of the very identical kind which the Science Standing Committee of the Institute desired to avoid. Further discrepancy was due to the superior quality of the six substituted piers (Series IA), the tests suggesting the paradox that brickwork is weaker at the age of ten months than at the age of four months. Admitting that architects and building contractors have ample reason to be grateful for the useful information contained in the Report, it is impossible to avoid the feeling of regret that unpremeditated variations were allowed to disturb the complete consistency of the data. We must, however, express satisfaction that the Report states without reserve all the conditions attending the tests, and contains the fullest possible particulars relative to the behaviour of each pier and wall when under test. Under the circumstances, the best way to consider the data is under three separate categories—(*a*) Series I. and II., representing average building construction at different ages; (*b*) Series IA, indicating the greater strength of superior workmanship even when comparatively new; and (*c*) Series III., showing the combined, but not the separate, merits of superior workmanship and of the wall bond as compared with the pier bond used in the two other series.

LIGHT AND AIR.

THE case of Fear *v.* Phillips, recently tried on Circuit, raised some interesting questions on the law of light and air. The plaintiff and defendant both held their premises on lease from the same landlord—the Corporation. The defendant had surrendered his original lease, and under a lease dated October, 1905, was building a large arcade and place of entertainment with access from three streets, having acquired additional premises for the purpose. The plaintiff had five windows looking out over a yard at the back of his premises, which was 11 ft. 8 in. in width. The defendant raised the wall to the north-east of this yard from 17½ ft. to 41 ft. 8 in., and the side wall to the north-west from 21 ft. 1 in. to 48 ft. 9 in., so that the yard resembled a box without a lid. The Court held that this created a nuisance within the rule laid down in the House of Lords in Coll's case, in that sufficient light was not left for the ordinary use and enjoyment of the plaintiff's house as a dwelling-house. The Court further held that the plaintiff had not acquiesced in this obstruction. The defendant, however, raised a further issue, that from 1901, a date when the right to light had been acquired, down to 1903, the plaintiff had acquired the lease of that part of the land upon which the north-east wall stood, and himself had subsequently assigned it to the defendant, and that as the plaintiff had not expressly reserved the right to the light, he had parted with it. On this point the Court held that since the easement had been suspended and not destroyed, the severance had not the effect which the defendant contended for, but in view of an appeal on this point, the damages were assessed on a twofold basis, viz.—if both walls were improperly raised at 400*l*., viz.—200*l*. for obstruction to light, and 200*l*. for obstruction to air, with some special damages, 25*l*., in respect of loss of health. Whereas if the north-west wall only gave the cause of action the only damages were to be 100*l*. in respect of loss of light alone. The judgment contains some instructive remarks as regards actions for loss of air. His lordship pointed out that the right to air could only be acquired by prescription at common law, or presumed lost grant, and that the obstruction must be of air coming in some definite channel, or to some aperture or window of the building. In the present case his lordship considered that if the north-east wall gave no cause of action the stoppage of air by the raising of the north-west alone would not be actionable, but if the whole structure enclosing the yard was improperly raised, then the salubrious character of the air was certainly affected and a cause of action shown.

The plaintiff's premises were used as a fish shop, and it was contended that, therefore, the air was self-polluted by the plaintiff; but this contention failed, the Court holding that a business like this which requires circulation of air was not of a character to prevent the plaintiff from recovering for deprivation of healthy air. The appeal in this case will be followed with interest, since it raises so many questions of importance.

NOTES.

Radium.

IN the paper read by Professor Soddy before the British Association it was said that with the discovery in the laboratory under the direction of Sir William Ramsay of the production of helium from radium the fact of the gradual evolution of one element into others passed beyond doubt. That view has been widely accepted by the general public, but it should be remembered that it is merely an opinion, somewhat unwisely based upon an isolated observation which does not prove the transmutation of elements. On the contrary, we may reasonably assume, as Lord Kelvin suggests in his letter to the *Times*, that the helium emanations in question were due simply to the fact that radium contains helium. Certainly no proof is forthcoming to the contrary, and until further knowledge has been obtained concerning radio-active substances it is clearly undesirable that scientific investigators should give free rein to their imagination in public utterances.

Metropolitan Water Supply.

IN a letter to the *Times* Professor Henry Robinson takes the opportunity of expressing his dissent from the somewhat alarmist views of Sir Alexander Binnie concerning existing sources of London water supply. Professor Robinson believes that by conserving flood waters in the Thames Valley the Metropolitan Water Board will find a solution of the question of improving the present supply and of meeting the requirements of the future. We have repeatedly advocated the creation of storage reservoirs as a means of obviating disastrous floods along the Thames Valley in rainy weather, and at the same time of furnishing ample supplies of water during the dry season. There is not the slightest difficulty in the way of a project of the kind which has been applied with such conspicuous success in Egypt, although with a different object. Considering the remarkable improvement that is now known to be effected in stored river water by bacterial agency, there really is no valid reason why flood waters should not be impounded in the manner and for the purpose suggested by Professor Robinson.

The Handcross Accident.

BY the evidence given at the Coroner's inquest on those who were killed in the motor-omnibus accident on Handcross Hill it is made clear that the disaster cannot be regarded as one caused by defective brake design. There is no doubt that clumsy, top-heavy vehicles, built for use in the comparatively level streets of cities, are quite unsuitable for the roads and hills of country districts. It is the fact also that, in this particular case, the driver committed an error of judgment in commencing the descent at too high a speed. Then when the attempt was made to reduce the speed by use of the foot brake the strain was apparently too much for the gear-box, which broke owing to an unsuspected defect in the main casting. Another cause which contributed largely to the disastrous effects of the accident was the condition of the road, the elevation being on the wrong side, and so leading to erratic behaviour of the vehicle in descending the hill. The preponderance of the scientific testimony, including that of Mr. Worby Beaumont, Professor D. S. Capper, and Mr. Godfrey Brewer, favours the view that the accident was caused, firstly by a hidden defect in the gear-box, and secondly by the condition of the road. The lessons of this disaster are that unsuitable vehicles must not be used in hilly country districts, and that more caution must be exercised by drivers in commencing dangerous descents.

Rail Motors.

THE observations made in this column last week, under the heading of "Motor-cars *v.* Railways," may fitly be supplemented by a few remarks suggested by statistics since made public by the Chairman of the Great Western. This company was one of the first to meet the competition of tramways by the establishment of "rail-motor" services, and in demonstrating the success of the experiment Mr. Baldwin was able to quote some really remarkable figures. Ignoring the returns of the road motor-cars—a form of competition which should perhaps be classed with railway-owned coaches and omnibuses—it appears that the Great Western Company conveyed close on four millions of people by their "rail-motors" during the past half-year. This traffic, running on the existing lines, and opening up, as it does, intermediate roadside stations, represents a distinct gain to the community, as well as advantage to the companies concerned. In the country, indeed, it has been stated that villagers who had never been in a train in their lives have become regular patrons of the "rail-motors" now that stopping-places have been made where previously the trains only flashed by. Never, probably, was the popularity of this mode of travelling more apparent than on the August Bank Holiday; and it is not surprising that arrangements are being made for extensions of the system in various parts of the country.

Municipal Debt.

THE return relating to the debt of the various London local authorities, as prepared by the statistical officer of the London County Council, a summary of which was published in the *Times* on July 30 should be read with interest. The return places the net debt of London, on March 31 last, at the enormous total of 103,237,454*l.*; 48,297,619*l.*, or 46·8 per cent., of this is attributed to revenue-producing services, but the total annual charge for interest and repayment amounted to 5,296,816*l.*, of which only 1,414,408*l.*, or 26·7, was contributed by the revenue-producing undertakings. One of the so-called revenue-producing services, the Thames Steamboat Service, it will be seen from the report of the Rivers Committee, is responsible for a loss of 50,096*l.*, exclusive of the capital locked up in plant. The ratepayers are now in the position of stock or shareholders in unlimited concerns, and the above figures would appear to show that they not only have to find the capital, but that they are rated to supply their own dividends, to some extent at any rate. Moreover, figures do not in themselves disclose the burden laid upon the ratepayers since they are customers of the municipal monopolies, and therefore have not the security they used to have when public undertakings were in the hands of private companies and competition was an element which tended to secure the lowest prices. The public are gradually awakening to the fact that Utopia is not to be reached by municipal trading if we may judge from statements contributed to the press from time to time by private individuals; and there are signs which lead us still to hope that a reaction may soon set in, and that municipal indebtedness may receive a check and private enterprise once more receive encouragement.

Glow Lamps.

ALTHOUGH the paper read by Sir William Preece to the British Association on "Glow Lamps and the Grading of Voltages" contains nothing very novel, yet the clear historical *résumé* given and the convincing proof of the importance of scientific testing are of great value to electricians. A large number of 220-volt and 110-volt 16-c.p. lamps were purchased in the open British market and sent over to New York to be compared with similar lamps made in America. It was found that the American lamps were rated much more accurately, that their efficiency was much higher, and that their life was much longer than the British lamps. A similar test was made in the National Physical Laboratory, with like results. The standard adopted in this country for the applied pressures allows a variation of 10 per cent. above or below the mean, and hence there is no inducement for manufacturers to rate their lamps accurately, as they can find a market for virtually all that they make. Sir William spoke highly of the new American method of flashing carbon filaments at a temperature sufficiently high to convert all the filament into graphite. The electrical properties of this substance are quite unlike those of carbon, as its resistance increases with the temperature. As yet the lamps are only used in this country for street lighting, but, as their efficiency is very high, they will probably utlimately supersede the ordinary carbon filament lamp. Although many metal filament lamps are now on the market they are still, so far as their life on commercial supply circuits is concerned, in the experimental stage. Messrs. Siemens Brothers supply a lamp made from tantalum, a recently discovered metal with a very high melting-point and very hard and ductile. The efficiency of this lamp is almost twice as high as that of the ordinary glow lamp. The mercury vapour lamps made by Hewitt and Bastian are also considered very promising. The method of telling the age of a lamp by the blackening of the bulb is useful, as it enables the consumer to tell with considerable accuracy when the lamp needs to be replaced. In our opinion the method of rating lamps in this country as 8, 16, or 32 c.p. is not so convenient as the Continental method of rating them as 10, 20, or 30 c.p. Sir William also pointed out the crying need for the standardisation of the pressures of supply in this country.

The Port of Liverpool.

APART from the progressive extension of facilities for the accommodation of shipping, much energy is displayed by the Mersey Dock and Harbour Board in maintaining the navigation channels and in preserving a clear passage through the bar. The annual report of Mr. A. G. Lyster, the Engineer to the Board, contains some figures which serve to convey a fair idea of the scale on which dredging operations are conducted in the Mersey. The quantity of sand removed during the year ending July 1 last from the two chief channels amounted to 8,901,300 tons, and from the bar to 1,753,100 tons, making a total of 10,654,400 tons, or nearly 25,000 tons a week. Since dredging was commenced in 1890 some 100 million tons of material have been removed from the bed of the river, with the result that along the centre of the Crosby channel the average depth at low water spring tides is 27 ft., which also is the ruling depth in the main portion of the dredged cut through the bar.

Drainage in Egypt.

ONE satisfactory feature of the last Report of the Public Health Department is the announcement that the Government are now taking into serious consideration the necessity that has long existed for proper systems of drainage in the chief Egyptain cities, and particularly in Cairo and Port Said. To the inhabitants of Western Europe it seems a strange thing that these two centres of population should be totally unprovided with any system of main drainage, especially in view of the enlightened administration that has been exercised with respect to irrigation and other branches of the technical service. Since Cairo and large towns in Egypt generally have been provided with more ample water supplies the saturation of the subsoil with sewage in Cairo and Port Said has become a serious menace to the public health. Owing to the rapid growth of buildings in the European quarter of Cairo plots of vacant land are becoming both scarce and expensive. Consequently many of the new houses are drained by cesspools situated beneath the entrance hall or central courtyard, these receptacles being periodically cleared by an already overworked private company. Thus it will be seen that the sanitary arrangements of Cairo are extremely unsatisfactory, and in Port Said, where the subsoil water rises to within a few inches of the surface, matters are still worse. Drainage schemes have been submitted at various times to the Government, and the decision that these are to be examined by an expert with a view to the execution of the most suitable project shows that the authorities have at last realised the pressing need that exists for reform in the direction here indicated.

The Dust Nuisance.

A REPORT presented by the County Surveyor at the last meeting of the Surrey County Council expresses the opinions that the best and most economical method of abating dust is to tar the surface of the roads, but that the surface of the tarred lengths is apt to lift in winter after rain and frost. While this may be the case on roads that are simply tarred, the same effect is not found when the surface consists of properly-laid tar macadam. We know several stretches of main roads in Surrey and other counties where tar macadam is doing excellent service and remains in good condition after the heavy wear and tear of two or three years. The Kent County Council have been and still are most energetic in the improvement of their highways, and as a result the dust nuisance has been much mitigated in the county. We have recently made a careful inspection of the main road from London to Folkestone, a large proportion of which is treated with tar and faced with tar macadam, and where the laying of tar macadam is in active progress on intermediate sections. On the treated portions of this road there is generally a little dust. This is evidently due to the fact that in the middle of the track, where horses are usually driven, small stones are pounded out and ground to powder by the wheels of heavy road locomotives and the iron-tyred wheels of other vehicles. The latter also seem to be wearing slight ruts on either side of the central horse track. Unless horses can be provided with shoes of less destructive character and vehicles generally with indiarubber in place of iron tyres, we fear it will be impossible to abolish dust altogether, although its production certainly can be very greatly reduced.

Power from the Rhone to Paris.

PROFESSOR A. BLONDEL and MM. Harlé and Mâhl, three well-known French engineers, have recently presented to the Paris Municipal Council a strikingly novel scheme for the lighting of Paris. They propose building a large hydraulic power station on the river Rhone near Bellegarde, about 250 miles from Paris. The electric power will be generated at a pressure of 120,000 volts, and will be transmitted to a distributing station either at Ivry or Charenton on the river Seine. Contrary to the usual practice the current used will be direct current. One of the advantages of using this kind of current is the reduction of the stress on the insulators supporting the overhead wires. The results of working the 60,000 volt three-phase transmission line from Colgate to San Francisco, a distance of 200 miles, have proved that insulators can be constructed to withstand a direct pressure of 100,000 volts to earth. In Blondel's scheme the maximum pressure across an insulator will never be greater than 60,000 volts, as the line is earthed both at the power and distributing stations. At the power station there will be forty-eight direct current series wound generators of the Thury type, each having an output of 1,000 amperes at 2,500 volts. They will be divided into two groups, and the routes for the outgoing and the return wire will be quite different so as to diminish any risk of a breakdown. M. Thury has proved by experiments on a commercial scale at Geneva that a complete break in either wire does not interrupt the working, as the earth can be used, at least temporarily, for the return circuit. At the distributing station there will be forty-eight motors in series, and the general arrangements will be similar to those of the power station. The power will be transmitted to substations in Paris at a pressure of 15,000 volts, and polyphase currents will be used. At the substations the pressure will be lowered to 110, 220, and 440 volts, and the existing networks will be used. It is calculated that the cost price of the power leaving the substations will be between 3d. and 4d. per unit, and as the price of electricity in Paris at present is about three times this there is room for a substantial reduction in price. The cost price is very considerably higher than that estimated for the London County Council, and the other power schemes recently considered by Parliament, but it obviates the necessity of burning thousands of tons of coal per day all the year round.

Pevensey Castle and Anderida.

IN the course of next autumn some excavations will be made in the precincts of Pevensey Castle with the expectation of discovering vestiges of Anderida. The Roman settlement extended over some nine acres. In our leading article of December 16 of last year we described in detail, with many photographic illustrations, the existing condition of the outer walls of the Castle which C. Roach Smith declared in his report upon the excavations made in 1852 to be as good examples of Roman masonry and as the best preserved as any in the Kingdom. Our illustrations evince the singular perfection of the work, its solidity and beautiful finish. For the planning of the Castrum we may refer our readers to Mr. Figg's valuable plan, printed in the *Sussex Archæological Collections*, showing that the way through the postern gate in the wall—some 10 ft. thick—on the north side was curved, and plotting an oblique postern in the south side of the later structure. Many interesting particulars, too, will be found in the Burrell MSS. at the British Museum, with drawings by Grimm. One MS. records that, in 1710, steps were taken to convey to the village the spring-water from the moat. It was then seen that the foundation of the ancient wall consisted "of piles planked over with slabs of extraordinary substance. . . There appeared no decay in the slabs; . . . the leaves of faggots found there were sound." In the XVIth-XVIIIth centuries, and during some thirty years since, the ruins served for a quarry; the facing of the north wall suffered wanton destruction. The operations of about fifty years ago revealed the foundations of the chapel having a nave 40 ft. by 16 ft. 8 in., and a chancel 12 ft. 8 in. long by 11 ft. 6 in. wide. The bastions of the main walls are solid masses of stonework. Whilst Pevensey may disappoint some antiquarians when compared, in a few points, with Richborough, it nevertheless presents features having an uncommon interest for students of archæology, for it possesses a history to which Richborough cannot boast a like, and exhibits types of military architecture in two different styles of fortification. At Pevensey, *temp.* William II., English and Normans met in battle for the last time on English soil; the castle was the prison-house of the Duke of York

in the days of Henry IV., of Joan of Navarre, Henry IV.'s widow, and of James I. of Scotland. The lordship, at one time owned by John of Gaunt, has passed to the present Duke of Devonshire through the Comptons in the XVIIIth century, and their successors the Cavendishes, Earls of Burlington.

The Architectural Association School of Architecture.

PARTICULARS of the work for the session 1906-1907 of the Architectural Association School of Architecture have been issued, from which it appears that a full and useful programme has been arranged. The recent change in the system of the teaching classes in connexion with the Association has already been briefly referred to in our columns. The School Committee mention that—"The question of preparatory training has been, and still is, the subject of much discussion among architects, and the constitution of the Board of Architectural Education must be a source of great satisfaction to all interested in the practice of architecture. It must be particularly so to the founders of the day and evening school, inasmuch as the course recommended by the Board, after the most careful consideration, agrees in almost every particular with that adopted and followed by the Association, for not only is the complete preparatory day course of two years insisted upon, but the continuation for a further two years in the evening school is also strongly advised." Sir Aston Webb, R.A., and Mr. Basil Champneys have been appointed by the Board of Architectural Education to act as special visitors, who will keep themselves in touch with the work of the school, and confer with the masters from time to time as to the progress made and the methods adopted. The master of the day school is Mr. H. P. G. Maule, who is assisted by Messrs. H. A. Douglass, J. H. Squire, H. L. Samson, and T. O. Foster. As we have previously mentioned, the Royal Institute of British Architects has decided to accept the drawings made during the first and second year in the day school in lieu of the testimonies of study for the Intermediate Examination, conditionally upon these being of sufficient merit, and upon the student obtaining the certificate of the Board of Architectural Education signed by the master and two visitors. Complete exemption can be obtained from the Royal Institute of British Architects' Intermediate Examination upon the same terms if the student satisfactorily passes through the whole four years' course. The master of the evening school is Mr. T. Frank Green, and the assistant masters are Messrs. J. H. Markham and A. Welford.

University College School of Architecture.

PROFESSOR F. M. SIMPSON sends us some particulars as to the B.A. degree for architectural students recently instituted by the Senate of the University of London. The day courses at the College provide systematic and practical training for students before they enter an architect's office on the lines recommended by the Board of Architectural Education. There are two courses—A. The Degree course (three years); B. The Certificate course (two years). The Degree course, leading to the degree of B.A. (Honours in Architecture), provides the opportunity by which architectural students can continue their general studies at the same time as they are commencing their professional work. A sound general education is now more than ever a necessity for architects, owing to the increasing number of practical subjects with which they require to be acquainted. The course also brings architectural students into touch with students in other departments of the College, who are pursuing different branches of work. The College possesses in its Engineering Laboratories, its Slade School of Fine Arts, and its Arts and Science courses valuable aids to a School of Architecture. The architectural training is much the same in the Degree and Certificate courses, except that the additional year enables degree students to carry their studies one step farther. In both courses students are well-grounded in the details and theory of building construction and in the nature and properties of material. Arrangements have been made with the Carpenters' Company for a series of demonstrations in each year in the practical working of materials at the Trades Technical School, Great Titchfield-street. These are supplementary to the lectures and classes on Building Construction at the College. In addition, visits are paid to workshops and to buildings in course of erection. The Professor of Mechanical Engineering provides a course specially for architectural students in steel and iron construction and in testing of materials. Parallel with the classes on Building Construction are lectures on the History of Architectural Development. It may be added that the Royal Institute of British Architects exempt from their Intermediate Examination students who receive a First Class College Certificate. Students already in architects' offices or who have had some experience in building can join any of the day classes or lectures by the term or by the session. Professor Simpson's assistant is Mr. Alan G. James. In the evening classes Mr. Leonard Stokes and Mr. Ernest Newton are the special visitors.

Custom House Quay.

THE Corporation of the City recently applied to the Chancellor of the Exchequer for permission to use the quay in the early hours of the day for purposes of Billingsgate fish-market. Having inspected the place, Mr. Asquith informs them that he is unable to comply with the request, in view of the current work of the Custom House and of the fact that the quay is an open space into which the public have (as, indeed, they had many years ago) the right of admission; the revived privilege is greatly appreciated. The quay, or wharf, 160 yds. long, was constructed for the rebuilding begun in 1813, after David Laing's designs, at the side of Ripley's Custom House, which contained the original "Long Room." A fire on February 12, 1814, consumed Ripley's edifice—the fourth Custom House in Lower Thames-street and the successor of Wren's, burned in 1718. The present front, however, of the middle portion is by Sir Robert Smirke, 1825-6; it was found necessary to reconstruct that part of Laing's building and to repair the wharf, a settlement having occurred through a failure of the foundations.

THE ARCHITECTURAL ASSOCIATION ANNUAL EXCURSION.

THE thirty-seventh annual excursion began this year on August 13, the headquarters being Stamford, which has once before been the scene of the excursion, in 1872; one of the party of that year is taking a prominent part in the proceedings this year. As usual, a large proportion of the party travelled down on the Saturday afternoon, and spent Sunday in exploring the town, and reconnoitring the immediate neighbourhood. As the ruins of Wothorpe Priory, St. Leonard's Priory, now a farmhouse, but in good preservation, and Burghley House are all within a mile of the town, there was no lack of interest; and several interesting sketches were made, and a good deal of ingenuity expended over the very enigmatical remains of Wothorpe, with its four large turrets and extremely battered walls. Stamford itself is so well known, and has been so well illustrated of late years, that little need be said at present; Saturday is reserved for the town itself, with its six churches and numberless fine houses.

Monday, August 13.—Wansford.

The first stop on Monday's drive was at Wansford, between six and seven miles out; a small village, with a large bridge, a church, and a fine old inn, now a private house, in the characteristic style of the country. It stands at the bridge head, and owes its name, the "Haycock," to a legend, enshrined in deathless verse by the local poet. It appears that a labourer, making hay in a meadow a few hundred yards up the Nene, went to sleep after his labours on a large haycock; and while he slept the Nene rose in flood, and washed him and the haycock away, till they were brought up sharp by the bridge, on which the village of Wansford had assembled. The shock woke him, and, fancying himself washed out to sea, he asked where he was. They told him "Wansford," to which he answered: "What, Wansford in England?" And the scene has been depicted by the painter of the inn-sign with much spirit. The bridge is probably the most conspicuous object in the village, as it has no less than eleven archways (some say there were once thirteen), though the roadway is extremely narrow. Like everything else in the neighbourhood, it is built of the local grey stone, which weathers a beautiful colour, and grows a plentiful crop of red and brown lichens. The church has a remarkable Early English arcade on the north side, with round-headed arches, and is entered from a late (1663) porch covering a fine Norman doorway. Mr. Traylen has restored the chancel, and worked in several Jacobean panels there and in the pulpit. The tower is surmounted by the usual type of steeple, and the whole church stands well on a steep bank leading down to the water-meadows of the Nene.

Nassington.

Nassington, where the party was met by the vicar, the Rev. C. J. Perceval, who very kindly showed them round, has a good church, with a fine tower and spire. The east wall of the tower, through which a Norman arch has been pierced, is believed to be Saxon; the nave and aisles are remarkable for extensive remains of colour decoration. St. George and the Dragon, the Virgin and St. Michael, and parts of a choir of angels over the chancel arch can still be made out with tolerable certainty. A peculiar feature in the chancel is that it descends one step from the nave, while another step descends to the sanctuary, an arrangement which proved a trap to several members of the party; in the north aisle is the shaft of a Saxon cross and several carved stone coffin lids. The pulpit is Jacobean, and retains its iron hour-glass stand, a relic of a more stalwart generation, while the vestry, once used as a parish school, and formed by a curious prolongation of the aisle beside the tower, contains a fine Chippendale chair. The nave is very lofty in proportion, with a very flat-pitched oak roof, and the aisle windows show a little ancient glass, while externally there is a good Early English doorway in the west wall of

the tower, and a late Norman or Transitional door, now walled up, in the north aisle. The restoration here also has been done by Mr. Traylen.

A house opposite the west door has a good oriel window, recently opened out, and traces of mullioned windows still walled up, and near by is the Prebendal house, for Nassington was at one time a prebend of Lincoln. This has been terribly knocked about to make it into a farmhouse, but from the yard at the back can be seen an early doorway, and traces of Perpendicular windows under an earlier label that once lighted the hall. On the other side of the house is the bay window of this hall, with a curious little "squint" apparently to command the front door. The present cellar is, by some, believed to have been a prison, but there is no evidence that it was ever used for any but its present purpose.

Fotheringhay.

From here a drive of some twenty minutes took the party to Fotheringhay, the lantern of the church being visible for some distance. The church is approached by an avenue of trees, and is a fine specimen of Perpendicular work, making one wish to see that gorgeous choir it was built to match. But the choir was collegiate, and on the dissolution of the monasteries was used as a quarry, together with the collegiate buildings. The nave, however, survived as the parish church; but even then its troubles were not ended, for Cromwell's soldiers tore up the brasses to the memory of the masters of the college, and XVIIIth century churchwardens sold off stalls, bench ends, and font cover, and apparently mislaid the original glass, which had survived Cromwell's men through the piety of the vicar. By constant neglect the church was falling into ruins, but is now being carefully and conservatively restored by Mr. Temple Moore. The Rev. R. Croyden Burton told the excursionists the history of the church; how it was founded by Edmund of Langley, whose son, Edward, Duke of York, died at Agincourt, in whose memory the college was established; how it was completed by Richard of York, who fell at Wakefield; how his son, Edward IV., buried him with great splendour in the choir; and how Elizabeth, visiting the church, was shocked at the ruin of the tombs of such "mighty princes," and bade make tombs for them, which stand on either side of the altar. In the centre of the west end of the nave stands the fine Perpendicular font, contemporary with the church, and a very fine early pulpit, surviving the XVIIIth century, has been rescued from some twenty coats of paint and varnish by Mr. Temple Moore. The nave roof has now been restored, but much of the original timber, and all the original carving, have been re-used in their original positions.

But the chief glory of the church is the lantern, once glazed, and used as a sort of lighthouse to the wanderers in the now vanished forests around. The nave roof is supported by flying buttresses, but the architect has unduly sacrificed strength to lightness, and the result is not at all happy. Fotheringhay is one of the few Gothic churches for which the original contract remains, the client to find all materials and cartage, and to pay the master-mason 3,000*l.* "sterlingues."

The village of Fotheringhay also contains the old hostel of the Dukes of York, one of the earliest inns in the country, though now a private house. It has a fine Tudor archway in the centre, in the room over which the executioner of Mary Queen of Scots slept the night before. Close by is all that remains of the castle, once one of the most splendid in England, now nothing but a meadow full of pits and trenches, the great mound of the castle keep, and one great mass of rubble masonry fallen from above beside the Nene. The approximate site of the scaffold is marked by a thorn tree, but the original plan of the castle is quite undecipherable, and no drawings or plans exist, so far as is known, either in the British Museum or the Record Office. All know the legend that James I. razed the castle out of respect to his mother's memory; but, unfortunately, it existed fairly complete for many years after his death, and Cotton, the antiquary, bought the hall, which he re-erected at Cunnington. The staircase is in the Talbot Inn at Oundle.

Apethorpe Hall.

From here the party drove to Apethorpe Hall, till lately the seat of the Earls of Westmorland, now the property of Mr. Leonard Brassey, who most kindly threw the whole house open to them and provided tea in the old hall of the house. He also placed at their disposal an old manuscript book of 1830, which gave many particulars of the building and its history. From this it appears that there is no mention of Apethorpe in Domesday Book; in fact it is first heard of in 1173, passing to the Fanes, afterwards created Earls of Westmorland, in 1617, at which time there must have been a considerable mansion on the site. The earliest existing remains are of the Tudor mansion, built, like the present, round two courts, one containing the principal apartments, the other the kitchen, offices, etc. The hall is on the west side of the court, and the principal entrance, unless there were three of them, under the existing gate-tower in the centre of the north side. Of this Tudor mansion the chief remains are the aforesaid gate-tower and the side of the court between it and the hall, the bulk of the hall and a fragment on the south front; some of the kitchens may also be of this date. The whole of the east side of the court, most of the south front, and the parapets of the hall are Jacobean; but in the XVIIIth century the south side of the court and the north side as far as the gate-tower were refaced by Colin Campbell, who wished to destroy also the Jacobean east side and to re-erect it in a style strongly resembling the National Gallery. At the same period "Capability" Brown swept away the old formal gardens on the south front, and replaced them by the somewhat commonplace arrangement at present existing. Recently Mr. Reginald Blomfield has made certain alterations on this south front, part of which, apparently on no evidence, documentary or other, is ascribed to Inigo Jones. There is also a scheme to restore the old gardens, sketches of which still remain.

The Jacobean work is interesting, not only intrinsically but historically, from the resemblance it bears to Emmanuel College, Cambridge, which was founded by the Earl of Westmorland who built this. The hall is a small, rather plain building internally, with an unusually deep bay window, in which is an elaborately-carved door of much earlier date. It has the usual arrangement of screens at the north end, with a minstrel gallery over, and is panelled with unusually large oak panels. Over the fireplace, in Jacobean lettering, is carved the following poem, apparently alluding to the punning motto of the Mildmays, once owners of the house :—

DURATURA DOMUS SIT JUSTI FIDA MINISTIA
ET STATUAT CERTUM SUMPTIBUS ILLA MODUM
VICINIS FAVEAT CAUSAS DEFENDAT HONESTAS
PELLAT AVARITIAE SORDIDA LUCRA PROCUL
SUBLEVET OPPRESSOS TENUES ET PASCAT EGENOS
ET PROPE SIT VIRTUS VIS INIMICA MIGRET.

Below is a translation into English heroic verse.

The hall is formed by filling in the arches of the Jacobean cloister, and leads by a few steps to an anteroom hung with tapestry, giving on to the long range of living rooms in the south side of the court. In the smoking-room the stone walls are left bare of plaster, and the fireplace is a fine early specimen brought here from the older part. But the principal rooms are on the first floor, in this following the Italian fashion; all these rooms have most elaborate chimney-pieces and plaster ceilings, the patterns on the latter being worked right down over the cove and stopping on the cornice. In consequence there is some confusion at the angles, but the effect is not at all unsatisfactory. The boudoir, instead of the usual coved ceiling, has a barrel flanked by two flat pieces, all elaborately moulded. At the end of this range of rooms, over the hall on the east side of the court, is the Long Gallery, a most delightful room panelled to the ceiling, which is more restrained than the others. The fireplace, however, is one of the most elaborate, with a statue of King David playing the harp as the central feature. Over the fireplace of the billiard-room, at the far end of the Long Gallery, is a curious wind-indicator, similar to that at Kensington Palace, communicating with a vane outside.

In the court are two early bronze cannon mounted on one carriage, one an English gun inscribed "THOMAS OWEN MADE THIS PESE 1567," the other a smaller one made at Bourges, and dated 1517, bearing the motto "Virtute monui."

The rain, which had threatened all day, came down sharply about half-past five, but only lasted some twenty minutes, and the party were able to start almost up to time. The drive back led through several very picturesque villages, notably King's Cliffe, whither some of the Fotheringhay stalls have found their way, but there was no time to stop there; as the excursionists approached Stamford by way of Wothorpe, they had several picturesque views of the town lying below in the valley.

Tuesday, August 14.—Grantham.

On Tuesday the party started from the Great Northern station at 9.30, and after about an hour's run arrived at Grantham, where brakes were awaiting them. Passing through the town in front of the Angel Hotel, and getting good views of the famous spire, they came to Belton House, the seat of Lord Brownlow. It is approached by a fine old gate and screen of wrought-iron, giving on to a wide avenue about a mile in length, at the end of which the house was seen, a not very interesting structure externally, with a projecting wing at either end and a pediment in the centre. The front door is approached by a wide flight of steps and leads into the hall, panelled to the ceiling, with carved festoons by Grinling Gibbons over the door opposite and the two fireplaces flanking it. A door to the right leads to the main staircase, panelled in white and gold, off which was an anteroom, painted a dark green, containing some fine china. Indeed, at every turn the party were surprised and delighted by the magnificent collection of Chinese porcelain, many pieces being of the "famille Rose," while a few were "famille Verte." From this anteroom one door led to the gallery of the chapel, panelled and carved in the style of Grinling Gibbons. The panels in this chapel were very large, and in some places where they were exposed to the sunlight have bulged rather badly. Another door from the anteroom leads to the small drawing-room, panelled to the ceiling, and with a painted floor, a peculiar and not very satisfactory arrangement. This led into the great drawing-room, a fine room running along the south front of the house, and communicating with the hall by the central door. Here was more Grinling Gibbons' carving on the panelled walls, with an elaborate plaster ceiling of the same period. These ceilings, by the way, are found in all the rooms on this floor, and are modelled in very high relief, the stems of the flowers being made of lead as it would have been impossible to make them in plaster. From the windows of the drawing-room the party had a good view of the formal garden below, reached by a flight of stone steps. This is a very fine specimen, happily spared us by "Capability" Brown, and makes a most charming picture, with a white peacock strutting in the midst. Beyond the drawing-room is a smaller room, containing a portrait of Henrietta Maria, by Vandyck, and of Philip II. of Spain, said to be by Titian. Beyond this, and corresponding to the antechapel in the other wing, is a small room full of XVIIIth-century portraits, apparently of the greatest interest, but as the family are away they are covered up and the party could only get surreptitious peeps at them. The room corresponding to the chapel has more carved festoons in the style of Gibbons, but here, instead of being left plain, they are gilded on a green ground, producing a very good effect. Between are immense canvases of birds and landscape and game, and at the far end a passage (the only one on this floor) leading to the stables.

From this gallery the party came to a small room with a fine set of wheel-back chairs, which were much admired by the connoisseurs; and the next room was the library, coloured in green and gold. Next came a small room, leading back to the hall, with more panelling and carvings, and hung between with tapestries, to accommodate which the door

has been carried up to the ceiling, though the doorway is only the usual height. All the door furniture on this floor and many of the ceilings bear the Brownlow crest of the greyhound, which also occurs as the finial to the ironwork at the entrance to the avenue.

The floor above has all been redecorated in the Adam style, if not indeed by the great brethren themselves, and the simplicity and restraint is very restful after the rather over-elaborate ceilings and carvings below. The library has a beautiful wagon ceiling covered with delicate ornament. This has happily been left white, but the next room, the boudoir, has unfortunately been picked out in green and brown, and the effect is hardly satisfactory. The doors, door furniture, and architraves also of these rooms would well repay more study than could be given them in a single morning, while the rooms were full of old chests, Chinese and English, and delightful furniture of all kinds. From these rooms a passage led to bedrooms, some with curious old Chinese papers, and a second passage to the back stairs had its walls covered with splendid porcelain on brackets. The State bedroom is panelled to the ceiling, and contains, among other fine pieces of furniture, a very good inlaid cabinet and a large Chinese chest.

The formal gardens, both that beside the house and another containing a pond and overlooked by an orangery, excited much interest. At the end of these, through a wonderful thicket of box, a gate with fine wrought-ironwork leads to the church, a small and not very interesting building, containing many monuments to the Brownlow family. The arcade of the nave is Norman, as is also the font, but the bulk of the building is Perpendicular. The door has a curious wicket, not, as usual, at the side, but in the centre, and cut to fit the panels.

The tapestries in the house are early XVIIIth century, made at Stamford. A few members were privileged to see the fine collection of early manuscripts, particularly an illustrated French work of 1480 by Voragine, but most had by that time betaken themselves to the gardens to sketch or photograph. From here they returned to a late lunch at the "Angel."

The "Angel," where the party lunched, is one of the oldest inns in the country, with a fine Perpendicular front; the inside has been modernised, but there remains in the bar a delightful groined stone bay. The front to the street has the entrance in the centre, flanked by a bay window on either side, and a third bay over the entrance is supported by the gilded angel which gives the place its name. The parapet is considerably enriched, and the boss of the groining in the bay window bears the pelican. There is a tradition that the house belonged to the Templars, but everything existing must be of far later date. The stairs, of the XVIIIth century, have very good and delicate balusters, three to each step, the base of the first lining with the step above, the other two being slightly lower.

Grantham Church.

From the "Angel" the party made their way in a sharp shower to the famous church, whose spire dominates the town. Here they were welcomed by the senior curate on behalf of the Bishop and by Mr. Bentley Rudd, a churchwarden and builder, who explained the history of the church. Originally a Norman church, it was enlarged by adding two bays at the west end. Then the south aisle was built up outside and over the Norman aisle, without troubling to centre the windows with the arcade, and the Norman aisle removed. At the same time the Norman arches were taken down and replaced by the present pointed arcade on the very graceful late Norman piers, and a similar treatment of the north aisle to the other was begun but only carried on spasmodically till it was finished by Bishop Fox with the "Corpus Christi" Chapel at the east end. Before this, however, the Norman chancel was removed, the end bay of the nave made of considerably larger span (probably to accommodate a great roodscreen, now vanished), and the present chancel built, though no chancel arch was made, a most unusual feature. Below the Lady Chapel (the eastern end of the south aisle) is a crypt, with the original stone altar, supposed once to have contained a relic of St. Thomas of Canterbury, and of interest to ecclesiological experts from the light it throws on the position of the priest during the mass, as the stone is considerably worn where he stood. West of this crypt is a second smaller one, once a charnel-house, and now used for the heating apparatus. The approach to the first crypt from the choir is by a fine Perpendicular structure of the nature of a companion-way, fitted with a heavy door and curious spring locks. At the west end of the south aisle is a small chained library, and in the west end of the nave is the pulpit, a most beautiful piece of decorated work, having almost the appearance of alabaster, richly carved with figures and emblems, now sadly mutilated. To the west of this rise the piers of the tower, beneath which is the richly-decorated west door.

The church was drastically restored by Sir Gilbert Scott in 1866. He abolished the clear-story, and put in the present screen. The reredos was the work of Sir A. Blomfield, but was altered and enlarged by Mr. Tapper, who also designed the altar case and font cover.

The north porch is remarkable, enclosing a very fine doorway of earlier date. The porch had three entrances, of which two are now glazed, and originally was vaulted with a room above, apparently a guild room. To make room for this floor the builder of the porch cut away the apex of the older doorway, and in this mutilated condition it survives. The vestry is very late, and contains traces of an altar. Here there is an early chair with carving on the back and arms.

But the glory of the church is the spire, which must be known to all travellers by the Great Northern. It is one of the tallest in England, being 281 ft. high, and has a slight cant to the eastward. The tower is about 140 ft. high, and 34 ft. square, of four stages, the lowest the west door and window, ornamented with the ball-flower, the second three bands of ornament, the third two windows in each side, and the belfry two very lofty windows with crocketed hood moulds. The stair is in the south-west corner, and the tower is crowned by four turrets with crocketed spirelets crowned by figures. From between these rises the spire, octagonal, with very slight broaches, and with bands of crockets along each angle. There is a peal of ten bells, one of the most numerous in England, some of which bear curious inscriptions. The spire has suffered several times by lightning, but has always been rebuilt.

Externally, the church is, in general, a very fine specimen of Decorated work, with a few later additions. The string course under the parapet, and, indeed, wherever else there was an excuse, is thickly carved with grotesque heads of men and monsters, done with splendid spirit and expression, and many of the windows, especially in the tower, have the ball-flower ornament. There are few monuments in the church, but some of the modern glass is good, particularly three windows by Mr. Kempe. The church is dedicated to St. Wulfram, a saint of France, whose relics were preserved here till 1565. From here the party made its way to the station, and got back to Stamford about six.

[Our report of the proceedings will be concluded in our next issue.]

THE ROYAL SANITARY INSTITUTE.—The usual autumn course of lectures and demonstrations on sanitary science as applied to buildings and public works has been arranged by the Royal Sanitary Institute. The demonstrations commence on September 15th and the lectures on Friday, September 28th, at 7 p.m. The lectures have been arranged to assist those desiring instruction in sanitary science as applied to buildings and public works, and are suitable to foremen of works, builders, and those engaged in allied trades, managers of property, teachers and lecturers, and others who are desirous of obtaining the certificate of the Institute in sanitary science as applied to buildings and public works. Inspections and demonstrations are arranged, and include visits to disinfecting stations, municipal depots, artisans' dwellings, waterworks, sanitary works in progress, refuse and sewage disposal works, etc., and other public and private works illustrative of sanitary practice and administration. The various subjects to be dealt with will be given by well-known authorities, and will be illustrated with diagrams, drawings, models, and lantern slides. The fee for the course is 2*l.* 12*s.* 6*d.*

MAGAZINES AND REVIEWS.

WE are glad to see in the *Quarterly Review* a really thoughtful and well-reasoned article on "Modern British Art," which affords something like a counterblast against the hysterical nonsense which passes for art-criticism at present. It is, to quote a phrase used towards the end of the article, "an appeal to the educated public, and not to the art-faddist." The writer of the article appears to retain the belief that there is, after all, something in the great traditions of painting, and that they are not to be regarded as merely worn-out conventionalities. He is even bold enough to stand up for beauty in art. "The neglect of beauty," it is observed, "has even gone so far that in some cases" (as far as the critics are concerned one might say, "in most cases") "modern art prides itself upon its ugliness, and any beauty based upon the great art tradition of the past is scouted as mere conventionalism. It will seldom go out of its way to seek or find this once so highly-appreciated quality; and if it did, some modern critic would begin to talk of want of truth, as, if forsooth, the beautiful were not as true as the ugly. In this respect both artist and critic might well learn from the inborn craving of the ordinary mind, and enrich the sphere of art by trying to express some at least of the qualities which *it* craves." We are the more glad to meet with this sound common sense on the subject, because we have seen evidences of late that the *Quarterly*, too, had got into the hands of the hysterical school of critics; and we hope such an article as this is a sign of its return to a healthier state of feeling and perception.

Under the heading "Art Handiwork and Manufacture" the *Art Journal* offers some remarks on stained-glass design in connexion with some illustrations of designs by Mr. R. Anning Bell. The writer takes Milton's well-known line

"And storied windows richly dight"

as a kind of concentrated expression of the true artistic character for a stained-glass window—attributing to "dight" a special meaning in the poet's mind, as indicating a design scrupulously prepared, "pre-trimmed" for the situation. The opinion is sound, but we do not think Milton had any such critical idea in his mind; he simply meant to convey the impression of the rich effect of colour of the windows; that they were "richly dight" means in modern phrase "richly got-up," and has only a reference to the general effect: Milton was not an art-critic. Mr. Anning Bell's windows as illustrated in the article represent in their treatment the kind of design which is best suited for stained glass, and perhaps the mediæval character maintained in them is defensible for churches, which are an institution descending to us from the mediæval period. But we shall not know all that can be done with stained glass until we get rid of the idea of mediævalism as especially connected with it, and recognise that classical, Renaissance, and abstract ideals can be equally well realised in this medium, provided that the treatment is such as is proper to the material. Mr. Whall has done something to suggest this, but he has not had much following. The number includes one of those foolish trumpet-blowings over artists of the ugly which have become almost the special note of what passes for art-criticism nowadays—a glorification by a Mr. Blaker of the pictures of Mr. J. Wilson Steer, whose landscapes, we are told, "sparkle with colour, they are happy, they laugh, and shout, and weep, and sing!" This kind of hysterical nonsense, which would be hyperbolical even if applied to the work of Turner or Alfred Hunt, and becomes doubly ridiculous when applied to paintings which, to the eye of a sane person, appear only as *outré* and eccentric, is a fashion of the day; but one must regret to see it in a periodical which was once characterised by the breadth and soundness of its judgments on art.

In the *Burlington Magazine* Mr. Lawrence Weaver, in the seventh article of his series on "Architectural Leadwork," deals with the interesting subject of "Scottish leaded spires," giving illustrations of those of St. Nicholas, Aberdeen; St. John's, Perth; St. Mary Magdalene, Edinburgh; and King's College Chapel and Gordon Chapel, Aberdeen.

The two last-named are spires covered with a surface decoration of panelling formed by lead rolls arranged to form a somewhat intricate design; these are interesting, but hardly things to be imitated; it is using lead in such a way as to create practical difficulties in jointing, and the effect is not worth the trouble and risk. The most satisfactory of all these designs is the comparatively plain one at Edinburgh; an octagonal spire with the vertical lines emphasised by a roll at each angle and one in the centre of each face; all these stopped near the top by a horizontal projecting moulding, above which is a little cupola-like finish with an ogee outline. Article V. on "English Miniature Painters," by Sir Richard R. Holmes, deals with that remarkable early miniature painter Cooper, the contemporary of Vandyck, of whom Walpole said that "if his heads were to be enlarged to the size of Vandyck's they would appear as if painted for that proportion"; adding that if his portrait of Cromwell could be enlarged to that extent, he thought Vandyck would suffer by the comparison. Judging by the illustration of the Windsor portrait of Cromwell, one would say there was reason in Walpole's conclusion; it is a head of remarkable force of character and expression; and, it may be added, much more flattering to the Lord Protector's intellectual than moral attributes; it is the countenance of a determined but decidedly unscrupulous man. Mr. S. W. Bushell commences an essay on "Chinese Porcelain with 'Marks,'" with two pages of illustrations of some beautiful work of this kind from the collection of the late Sir Robert Meade. Mr. C. J. Holmes continues his essay on "The Development of Rembrandt as an Etcher," which we gather is to be concluded in the next issue. The article is interesting, the more so by aid of the introduction of comparative illustrations from a good many of Rembrandt's etchings; but we think we can foresee a time when people will ask whether too much has not been made of some of these works. It seems to us that Rembrandt's fame as an etcher lives mainly on a few very remarkable works, in consequence of which a kind of enthusiasm has been got up over his etchings which they will not all bear out. What, for instance, is the charm of the "Christ Carried to the Tomb," with its scrawly landscape background and undignified figures? Would anyone have thought very much of it if it had not been signed "Rembrandt"? The "Christ Appearing to His Disciples," given on the same page, is a rough sketch for a powerful effect, but certainly not a realisation of it. Rembrandt was a great genius, but there is rather a tendency at present to exaggerate him, or, at least, to attach an exaggerated value to works in which he is not at his best.

The *Architectural Record* (New York) has an illustrated article on "Old Houses in Jefferson County." The subject of these old Colonial houses is one which Americans who take interest in architecture do not seem to tire of, and no wonder, for it is one of the most interesting and picturesque chapters in the history of domestic architecture; interesting it should be to Englishmen too, for these houses are essentially English in style and feeling, only modified by the nature of the materials most available in the new country—wood being often employed where stone would have been used in England, and so on. Not only are these old houses interesting architecturally, but the names connected with them are full of historic associations. One of those illustrated, called the Peugnet House, a stone house built on the banks of the St. Lawrence at Cape Vincent in 1808, is said to have been prepared by Count Chaumont for the use of Napoléon, when the latter was debating whether he should accept the advice of some of his friends to sail for America—so it is put in the article; it would be more correct to say, when he was endeavouring to get to America, which was certainly his intention after Waterloo, could he have succeeded in carrying it out. The choice of the house for him was probably due to its having been built by French hands and with French materials originally; though, oddly enough, it is as English-looking in general character as most of the Colonial houses. It has elliptic arched windows and doors on the ground floor, with wooden transoms and centre mullions; square windows above, and a parapet which is solid except over the windows, where there is an open balustrade introduced. The house was owned by Hyacinthe Peugnet, who fled from France after Napoléon's first abdication, and opened a school "which was attended by boys from Canada and Louisiana as well as the neighbourhood"; and here the Confederate General Beauregard (still a French name) had been at school; while the ballroom was used for drilling soldiers during the English war of 1812-14. Truely a historic house.

In the *Architektonische Rundschau* the only two noticeable things among the large plates are an interior of a "Protestant Church," by Herr Schumacher, of Dresden, which represents a more or less clever adaptation of *art nouveau* decoration to a church interior—angels entangled in knots of tapeworms, etc.; and an interior of a "Galerie," by Professor Grenander, of Berlin, which is apparently photographed from an actual interior, and represents what may be called the extreme of perversity in ugliness and anti-architectural character. That any client should wish for such an interior and any architect be found to design it is a sad reflection on the state of the art in Germany. An article on the third Arts and Crafts exhibition at Dresden, this year, is headed by an illustration of an interior of a church vestibule, by Professor Schumacher, which is original and picturesque, especially the deep frieze decorated with separate groups of processional figures in high relief, almost in the round, against a background of decorative walling.

An illustration of a dwelling-house—No. 3, Durlacher-strasse, Berlin—in the *Berliner Architekturwelt*, is worth looking at for its effective treatment of recesses and balconies in solid masonry, and the manner in which decorative bas-relief sculpture is introduced. This is a street front which is original without being eccentric. The architects are MM. Herbst & Jonatha, of Berlin.

An article of historical interest in *Public Works* is that on "Places of Public Resort in Ancient Rome," by Mr. Thomas Ashby, Jun., F.S.A. In a previous number of the same magazine the writer described the great bathing establishments which were very largely used as places of public resort. The present contribution is a collection of notes upon places such as the campi and the fora, where the people were wont to congregate, and the basilicæ and porticoes, which afforded refuge from the summer sun and winter wind to those bent on business or pleasure. The article closes with a brief reference to spectacular buildings, such as theatres, amphitheatres, and circuses. The subject is one upon which Mr. Ashby is well qualified to write, and it is to be regretted that the space at his disposal has prevented him from dealing with it in a manner likely to satisfy lovers of archæology. In "The Practical Design of Canal Falls" Mr. W. G. Bligh, M.Inst.C.E., describes and criticises various types of canal weirs to be found in India, and gives numerous data and formulæ for the scientific design of such structures. The only other original articles are one on "The Development of Mechanical Boat Propulsion," by Dr. John S. Owens, A.M.Inst.C.E., and the concluding part of a serial article on "Phenomena of the Ebullition of Water," by M. E. Wickersheimer, *Ingénieur-en-chef des Mines*, the last-mentioned being chiefly devoted to discussion of the economy of fuel to be effected by a variety of boiler fluid manufactured in Paris.

In the *Contemporary Review* Mr. L. March-Phillips writes an article on "Form and Colour" which combines a good deal of thought in its main thesis with a good deal of captiousness in detail. His main point is that Form appeals to the intellect and Colour to the imagination; that Form is the essential quality of Western architecture and Colour of Eastern; and that the simultaneous dominance of both qualities is impossible, the real appeal of colour to the emotion being only when it has become the master element and form is neglected for it. Of course it is almost a commonplace to students of architecture that where colour is a predominating element less attention is given to form; Oriental architecture is poor in and almost neglectful of profile in mouldings, for instance. We think he is quite right in his position that Gothic architecture is in reality purely an architecture of delight in form and construction, the colour which was largely used in it internally being colour limited by and defining the form—in other words, decorative colour. The following remarks have a good deal of truth, and are at least suggestive as a new way of regarding the subject:—

> "So long as it is strictly defined by the shapes of things colour remains a mere attribute of form, subordinate to and dominated by the meaning of the form it belongs to. This is the decorative use of colour. But no sooner does it call in the help of light and shade than it is delivered from this servitude. Indeed, it asserts a tyranny of its own, and, instead of being used by, it uses form, no longer defining shapes and outlines, but helping itself to just so much as may be necessary to the carrying out of its own schemes and effects.
>
> With this deliverance, too, colour puts on its rich, emotional hues, those hues which never can exert their real and characteristic form so long as they are used strictly and obediently to define shape. I daresay the reader has often noticed how painful is the effect of the painted scarlet coats of hunting men or soldiers, with their accurate, Bond-street cut, of which there are usually several to be seen in our yearly exhibitions. The fact is there is always something outrageous and revolting in the utter subjection of so great a colour to so mean a form. Colours there are which may rightly enough be subjected to form, but they are not the great emotional colours. It is the nature of emotional colour to assert the qualities inherent in itself and with the help of light and shade to overcome the restrictions of form."

But we hardly think that Titian can be cited as an example of an artist in whose works form is subordinated to the aims of colour. Rather is Titian an exceptional instance of a painter with whom form and colour are of equal importance and work together to the effect. Mr. March-Phillips suggests that the quality we find in the works of Titian and the Venetian school of painters generally, in regard to the supremacy of colour, we also find in St. Mark's, as architecture; but if it is intended that there is any common cause for this, he must be forgetting that the architecture and the painting referred to are separated by several centuries, and that the Venetian architecture contemporary with Titian is to be found in the late Renaissance palaces and not in St. Mark's. Nor is it quite correct to say that symmetry and centrality is the special note of Western as distinguished from Eastern architecture. St. Mark's itself, though very badly set out, is symmetrical in its main disposition; the Taj is as symmetrical as the Parthenon, and much more so that the Erechtheion; so is St. Sophia as far as the interior is concerned, which was the main object with its designer. The carelessness as to form in Oriental architecture applies rather to details of ornament and profiling than to general design. The contemptuous and sweeping condemnation of modern London architecture in which the writer indulges is of course part of the stock-in-trade of the ultra-modern art-critic, and is not worth notice; it is a cheap and easy way of filling in a page; but there is something too absurd in the criticism of the London County Council for intending to erect on the cleared site in the Strand "a series of buildings in the style of the French aristocracy prior to the Revolution," and the remark that this recurrence of a democracy to "the cast-off trappings of Versailles" is one of the most ludicrous incidents in architectural history. It is needless to remark that the London County Council, as such, have no intention of erecting anything there; they proposed to lease the land to a French company; and the reference to Versailles as a typical building of the period only shows the writer to be exceedingly ill-informed as to XVIIIth century French architecture. Versailles is poor with the poverty of the individual architect; the same reign produced Gabriel's fine Ecole Militaire and the group of buildings at the top of the Place de la Concorde, to name nothing else; and the best traditions of Renaissance architecture have more of noble and beautiful than Mr March-Phillips seems able to understand. How far classic tradition should influence modern architecture is no doubt a subject for argument; but it is not one that can be lightly dismissed in an off-hand sentence in a magazine article.

The *Pall Mall Magazine* contains a short account of the remarkable undertaking of the railway to the top of the Jungfrau, still in progress. It has fortunately been stipulated that this should be entirely a tunnel railway, in order to avoid vandalising the Alps; but the stations will have openings to the face of

the rock to give the view of the panorama at each station; as each will be at a much higher level than the last, the successive effects ought to be very fine. The blasting out of the tunnels through hard rock is of course a slow and costly business, only to some extent compensated for by the fact that no arch ringing is required. The railway, it is stated, is to be a rack-rail one, to be worked at a speed of about four miles an hour; and the fare for the complete trip is to be 45 francs, at which price the undertaking is expected to be remunerative. On the whole the result seems likely to be less objectionable, from the æsthetic point of view, than might have been expected.

Harper contains a really useful and valuable article, for the general reader, under the title "Some Rare Elements and their Application." It is written by Mr. R. Kennedy Duncan, Professor of Chemistry in Washington and Jefferson College, and is in fact an explanation of the history and the scientific basis of the Welsbach, Nernst, Osmium, and others of the most modern lamps. It will surprise many readers, no doubt, to learn what delicate scientific investigation and experiment has been necessary before these various forms of burner could be brought into operation.

The *Century* contains eye-witness accounts, with numerous illustrations, of two great recent calamities, the burning of San Francisco and the eruption of Vesuvius.

SOME FURTHER NOTES ON ASPHALT.

THE following account of recent developments in the knowledge of asphaltic substances is intended to be supplementary to the series of articles which appeared in Vol. LXXXVII. of the *Builder*, in pages 609 *et seq.*, concluding on page 703:—

1. *Ascertaining the Melting-point of Asphaltum, Pitch, and Similar Substances.*

The apparatus devised by Kraemér & Sarnow (see Vol. LXXXVII., page 703) has been found by M. Wendriner to give results which in general are satisfactory, but capable in one or two particulars of amendment. The variation in results is due to the difficulty of making the plugs of pitch of uniform shape and exactly equal depth, and more especially to differences in the rate at which the temperature rises during the operation of determining the melting-point.

As modified by him the apparatus assumes the form shown in Fig. 1, for insertion in

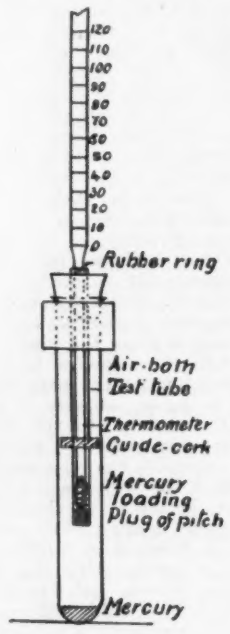

FIG. 1.

the heating bath of the one shown (Vol. LXXXVII., page 703). This new portion consists of a wide test tube, enclosing a narrower tube closed at the end by the plug of pitch. The pitch is covered with mercury, and into this mercury a thermometer dips. The melting-point temperature is indicated by this thermometer at the moment the load of mercury drops through the plug of asphalt or pitch. Three or four plugs of the substance to be tested are prepared for each determination of melting-point, and this is done in the following manner:—A glass tube 16 cm. long and 8 mm. wide, 1 mm. thick, and with one end ground perfectly flat, is fixed in a clamp, and a glass rod 20 cm. long and 7½ mm. thick is inserted from below until the end is exactly 10 mm. from the upper end of the tube. Into the hollow space left in the upper portion of the tube a drop of water is introduced, and the glass rod is turned a little, so that the capillary space around it becomes filled with water. The water is then removed by filter paper and by gently warming the tube. The molten pitch, in a thinly fluid condition, is dropped into the hollow space, allowed to cool, the excess cut off level with the edge of the tube, and the glass rod withdrawn. The interior of the tube is now dried by means of a glass rod covered with filter paper, and 10 grms. of mercury are introduced. The thermometer is fixed in the tube by means of a rubber ring, so that its bulb is, as far as possible, immersed in the mercury, but does not touch the pitch. The tube is then suspended within the wide test tube by means of a cork 20 mm. high and a guide cork. The wide test tube, 20 cm. long by 25 mm. diaphragm, serves as an air bath. It is provided with a cork stopper, by which it can be suspended from the cover of the heating bath.

The method of using the apparatus is as follows:—A preliminary test is made for the purpose of ascertaining approximately the melting-point, so that the water in the heating bath may for the proper tests be maintained at about 10° C. above the melting-point temperature found by the preliminary test. In the preliminary test the water in the heating bath is brought to the boil, the air bath containing the tube closed by the plug of pitch is introduced, and the temperature at which the mercury drops through the pitch is noted. The air bath is then removed, allowed to cool to the ordinary temperature, and fitted with a fresh tube with a pitch stopper. The heating bath is allowed to cool to a temperature of 10° C. above the melting-point previously found, and is maintained at this degree during the true determination, which is carried out in other respects as in the preliminary test. A series of three tests should be made, and the results should not differ by more than a small fraction of 1° C. The description will have made it clear that the improvements consist in bringing the thermometer much nearer to the pitch than in the original apparatus, and in providing a more uniform application of heat by limiting the temperature of the heating bath to the margin of 10° above that of the melting-point of the asphaltic substance.

2. *Carbon Tetrachloride as a Solvent for Differentiating Bitumens.*

Messrs. Clifford Richardson and C. N. Forrest find that when moderately pure this solvent possesses distinct value in the examination of asphalts, thus providing an additional agent for the classification of the constituents of bitumen and its congeners. Their investigations may be summarised as follows:—Considered merely as a standard for extraction on a commercial scale, it is the equal in its solvent power of almost all other solvents, exceeding them to some degree with certain substances. The material as supplied to the trade by the Acker Process Company, of Niagara Falls, New York, is practically pure, and has a specific gravity of 1·604 at 15° C., as against 1·270 for carbon bisulphide. It requires 1·3 lb. of tetrachloride to go as far as 1 lb. of bisulphide, and experiments have also shown that its solvent action on bitumens at least is not as prompt as that of the bisulphide, probably the lower rate of diffusion being due to its greater density. The value of the tetrachloride as a solvent in the examination of bitumens lies in the fact that it exercises a selective action on the hydrocarbons and their derivatives, composing many of the native bitumens, residual pitches, and tars; while the true asphalts are dissolved thereby to the same extent as by carbon bisulphide. The same may be said in regard to gilsonite, but such native bitumens as grahamite are not soluble in tetrachloride at air temperatures to the same extent as in carbon bisulphide, as much as 75·3 per cent. of an insoluble nature having been found in a grahamite from Colorado, although the type of grahamite from West Virginia contained but 1·3 per cent. in this form. The value of the solvent for differentiating the extent to which any native bitumen has been weathered and condensed is, therefore, apparent. It is of additional value in another way in revealing any changes which may be brought about in a bitumen which, although quite soluble in tetrachloride in its native state, has been injured by treatment at excessively high temperatures in industrial processes. For example, residual pitches carefully prepared from California and Texas petroleums having an asphaltic base are entirely soluble in tetrachloride at air temperatures, but, as they are prepared industrially, they contain from 1 to 7 per cent. of bitumen not soluble in tetrachloride, very conclusive evidence that the original bitumen has suffered a change in character at the high temperature to which it has been submitted, this often reaching 700° to 900° F. In the same way, in the careless refining of asphalt for industrial purposes the bitumen may become more or less altered and insoluble. If this has taken place, it can be readily detected by determining if anything is present insoluble in tetrachloride which is soluble in carbon bisulphide. For instance, an asphalt recently introduced commercially showed 17 per cent. of bitumen insoluble in tetrachloride, but with improvements in the process of refining the asphalt, this form of bitumen (viz., the insoluble in CCl_4) disappeared.

To obtain all the advantages of carbon tetrachloride as a selective solvent it must be employed at a temperature not exceeding 25° C., and it should be free from carbon bisulphide. Its odour is aromatic, it is non-inflammable, and its toxic effect is nil, in each respect comparing most favourably with carbon bisulphide. (Compare page 671 *lococitato*.)

3. *The Constituents of Asphalts and Pitches.*

The investigations referred to on page 671 *lococitato* and the results scheduled in sections 2 and 4 of Table III. by Messrs. E. Donath and B. M. Margosches have been continued. The former gentleman, employing the method described, finds that a number of commercial products sold under the name of "stearine pitch" are derived from the distillation of fatty acids separated from wool washings. They are brownish to black pitchy residues, differing materially in characteristics from true stearin pitch, which latter is used for varnishes, for insulating materials, and in the preparation of roofing boards and of waterproof paper. The last-named gentleman has examined by the same method a number of varieties of wood-tar pitch sold as artificial asphaltums. The samples of beech wood-tar pitch tested had the following percentage compositions:—

Bosnian pitch.....	63 carbon ...	6 hydrogen.
Hungarian pitch	66 carbon ...	10 hydrogen.

The amount of oxygen in wood-tar pitch is thus much greater than in other artificial "asphaltums." For distinguishing between individual products the following method is recommended:—Ten to fifteen grammes are subjected to dry distillation. In the case of wood-tar pitch a small quantity of a strongly acid aqueous liquor is obtained on which an oily layer floats. A confirmatory test for wood-tar pitch is that when treated with carbon tetrachloride the latter is scarcely coloured. In the case of coal-tar pitch the oily distillate dissolve completely in absolute alcohol and glacial acetic acid. Coal-tar pitch also always contains anthracene, which can be recognised by oxidising it by chromic acid, and then producing the intense red coloration by boiling with caustic soda solution and zinc dust.

If the distillate does not give a clear solution with alcohol and glacial acetic acid, the product may be lignite-tar pitch, petroleum pitch, asphaltum, or a stearine pitch. A portion of the original product is boiled for some time with alcoholic potash, and the hot liquid filtered. In the case of wool-fat pitch a fairly abundant precipitate forms on cooling, which gives the cholesterol reactions.

In the case of stearine pitch no separation, as a rule, takes place, but on evaporating the alcohol and treating with dilute hydrochloric acid the fatty acids separate. Natural asphaltum when treated with alcoholic potash colours the liquid only slightly at first, but more intensely after some time, lignite-tar pitch colours the liquid immediately, and petroleum pitch gives either no coloration at all or an extremely weak one.

In testing the behaviour of the Bosnian pitch and the Hungarian pitch with the different solvents, about 0·1 to 0·3 grm. was treated with about 10 to 15 c.c. of the liquid. Carbon tetrachloride acquired a faint yellow tinge after about twenty-four hours, whilst at 30° C. the yellow coloration was more pronounced. Carbon bisulphide remained colourless for some minutes, and then acquired a faint yellow coloration, which reached its maximum intensity after about fifteen minutes, and did not darken perceptibly after standing for twenty-four hours at the ordinary temperature of 30° C. This test, therefore, affords another means of distinguishing between wood-tar pitch and other artificial "asphaltums." A still more characteristic test was given by petroleum spirit, which remained absolutely colourless after standing for twenty-four hours in contact with the pitch, although it dissolved about 2 per cent. of the samples. Experiments with other light petroleums (benzine and ligröin) as solvents gave the same results.

Margosches compares these results with those found by Davies in 1884. The samples of wood-tar pitch tested by Davies were much more soluble in petroleum spirit, viz., from 16 to 24 per cent., and Margosches accounts for this by the fact that in 1884 a smaller amount of tar oils was expelled from the pitch during distillation. On the contrary, the present-day samples were derived from wood-tars that had been distilled at 270° C. On wood-tar pitch chloroform had the greatest solvent action, a dark brown solution being obtained; alcohol dissolved only a small amount, the liquid becoming yellow after some time; ether behaved similarly, though its action was somewhat greater. To benzine the Hungarian did not impart any coloration for a long time, and after twelve hours it had only a faint yellow tint; but with the Bosnian it became yellow in about five minutes, changing to reddish yellow after thirty minutes and to red after about twelve hours. Successive extraction of this sample with petroleum spirit, benzene, and carbon bisulphide showed that those portions that were soluble in carbon bisulphide were for the most part insoluble in benzene and petroleum spirit.

4. *Detection of Adulterants in Natural Asphaltum.*

For this purpose B. Malenkovic has adopted two principal and several subsidiary methods, and in the following summary of his contribution to the *Oesterrie Chemiker Zeitung*, 1905, is set forth the mode of application to the bitumen of natural asphalt and to the usual commercial substitutes.

Method No. 1.—The tests were made with the bitumen extracted from the several commercial products by extraction in a Soxhlet apparatus with carbon bisulphide and dried for half an hour at 105° C. (*a*) When 1 grm. of each class of bitumen was boiled for about fifteen minutes with 100 c.c. of decinormal sodium hydroxide solution, the following were the manifestations :—

Bitumen from	Appearance with Test (*a*).
Natural asphaltum	Light brown liquid, in which the coloured particles appear to be uniformly suspended, but not dissolved.
Petroleum pitches	A colourless solution.
Coal tar pitches ...	A lemon yellow solution.
Beech tar pitch ...	A reddish brown liquid, having an odour of creosote.

(*b*) On boiling 1 grm. of the bitumen for a quarter of an hour with 100 c.c. of 40 per cent. formaldehyde, that from natural asphaltum does not colour the liquid, but all the adulterants do so.

(*c*) If 1 grm. of the bitumen be dissolved as far as possible in 10 c.c. of carbon bisulphide, the solution filtered, treated with 90 c.c. of petroleum ether, and again filtered, the filtrate has the following appearance :—

Bitumen from	Appearance with Test (*c*).	Appearance with Test (*d*).
Natural asphaltum ...	Red	Colourless
Petroleum pitches ...	Red to brown	Yellow
Coal tar pitches	Yellow	Yellow

(*d*) To the filtrate from (*c*) on adding an equal volume of 85 per cent. alcohol and gently shaking the alcoholic layer remains colourless in the case of natural asphaltum, but is coloured yellow with adulterants. Malenkovic states that by this test the presence of 2 to 5 per cent. of petroleum pitch in natural asphaltum can be recognised.

(*e*) For the detection of larger quantities of paraffin, ceresin, mineral wax, etc., the bitumen is extracted (not by bisulphide of carbon as in the foregoing) with petroleum ether, the extract evaporated to dryness, 1 grm. of the residue dissolved in 10 c.c. of petroleum spirit, and 90 c.c. of acetone added. The results of tests are as follows :—

Bitumen from	Appearance in Test (*e*).
Natural asphaltum...	Solution generally remains clear.
Petroleum pitch	Solution becomes turbid.
Petroleum pitch and Paraffin, etc.	A flocculent precipitate is obtained.

Method No. 2.—This is based upon the percentage of bromine taken up the various bitumens, and is called the maximum bromine value.

About ½ grm. of the bitumen is dried for exactly half an hour at 105° C., is then heated in a Soxhlet apparatus with carbon tetrachloride and 25 c.c. of bromine without water, for twenty-five hours, or until hydrobromic acid is no longer evolved. The mixture is then poured into a porcelain dish, the excess of bromine and carbon tetrachloride expelled on the water bath, the residue dissolved in carbon tetrachloride, the solution placed in a weighing-bottle, evaporated to dryness, dried for a quarter of an hour at 105° C., and weighed.

The following were the results with the various sources of the bitumen so tested :—

Bitumen from	Percentage of bromine taken up.
Natural asphaltum	89—93
Petroleum pitches	62—72 (average 67)
Coal tar products	173—191

5. *Bitumen for Electrical Uses.*

For much of the information contained in this note the writer is indebted to a paper read before the Faraday Society by Mr. D. A. Sutherland and the discussion thereupon.

The specific resistance to electricity of bitumen is not very high, and consequently its use as an insulator has been confined mainly to installations of low-pressure currents. It is, however, largely used in the laying of electric cables for the purpose of excluding moisture, and to be effective in this respect it must not crack under changes of temperature or vibration due to traffic in streets. When refined bitumen *per se* is heated with from 5 to 20 per cent. or more of sulphur it becomes hardened and altered in character, and some of these mixtures are used on cables prepared with so-called vulcanised bitumen. Whilst refined bitumen is used in the best of such vulcanised coverings, there are others where the various substitutes enter very largely.

Insulating compositions vary according to the purpose for which they are intended, whether (*a*) for joint boxes, (*b*) for the filling of troughs, or (*c*) for the covering of cables. It is important that the composition of the bitumen should be known, especially when it is to be brought into contact with indiarubber, as a whole length of cable may be permanently injured even by contact at one end with the objectionable material. Another danger to be guarded against is the possible loss of the non-hygroscopic property of bitumen by admixture with crude Trinidad pitch of clay, plaster of Paris, or siliceous matter. Bitumen used in the joint boxes employed in making connexion between different lengths of cable should be effective in excluding water, which otherwise would cause leakage of current, and it is important that the bitumen should not be brittle when cold, otherwise it will not be able to accommodate itself to the linear expansion and contraction of the cable due to changes of temperature. With "solid laid" cable to secure the complete exclusion of moisture even lead-covered cables—which may have a pin-hole in the sheath—are frequently laid in troughs filled with bitumen.

Bitumen cables, such as "bitite," as used by the Callender Company, are usually laid in such troughs, and even naked wires have been laid in this way. Under these circumstances it is obvious that the bitumen should be inactive towards the metal or other material employed in the cable. Wooden bridges in troughing are frequently a source of weakness, especially in damp places, and the porcelain bridges are to be preferred for keeping the cable straight, even to wood bridges that have been impregnated with damp-proofing liquids. In covering the cable every part must receive a reasonable thickness of bitumen. The liquid bitumen taken from the boilers at a temperature of about 450° F. is cooled by pouring into smaller buckets until it has reached about 350°, at which temperature it is poured into the troughs. Work should be suspended when moisture is on the cable, as bitumen will only adhere to a dry surface. Asphalt conduits or troughs—as in the Howard conduit—consist of a layer of asphalt ½ in. thick immediately inside a sheet-iron cover of about 1-16 in. thickness. The cables are laid in the trough and a sufficient quantity of bitumen poured to cover them, and the rest of the trough filled in with asphalt concrete. Joint boxes or the trough on this system may be bent on warming where necessary to avoid obstructions, and the connexion between the two made impervious by molten bitumen.

For cable insulation vulcanised or unvulcanised bitumen should be neither too hard or brittle as to crack when bent, nor, on the other hand, so soft as to allow the conductor to become eccentric; should be impervious to moisture, have considerable mechanical strength, and yet be so tough that it is not readily torn or split; should not soften or deteriorate by fairly high temperature, and not be affected by gases or weak acids.

Typical or standard substances possess the following characteristics :—

Natural bitumen is brownish-black in colour. In structure it is amorphous. The specific gravity varies from 0·95 to 1·5 or more, according to the mineral matter present. Its melting-point varies widely from 180° to 600° F., sometimes only softening and melting with decomposition at over 600° F. It varies from the liquid form of maltha through tough and leathery substances to brittle solids. Its value in compositions for electrical uses depends chiefly on the nature of the pure bitumen, which can be prepared from the natural substance, its melting-point and most of all its natural elasticity and capability of being drawn out into threads.

Bitumen extracted from Trinidad crude is brilliant and glossy, pitch-like in appearance, semiconchoidal in fracture, but yields to gentle pressure and flows slowly under the influence of heat. It softens rapidly at 169° F., flows freely at 181° F.; it is not liquid until above 212° F. Its specific gravity after correction for 2·6 per cent. of mineral matter is 1·032.

Refined bitumen is black in colour, and has the consistency of bees-wax. It melts at about 220° F., and if well made should be capable of being drawn out into long strings. The further it can be drawn, the better the quality. It is a mixture of the most suitable ingredients of natural bitumen. Trinidad pitch has to be freed from water, volatile oils, unstable sulphur compounds, and most of its mineral matter, and has in consequence to be rendered softer by the addition of some suitable oil. Goudron de schiste, a shale oil, is very largely employed for this purpose, and a specially-prepared petroleum residue is also made use of. It is to the wise selection of this softening agent and to the care exercised in the heat

treatment during refining that the qualities of refined bitumen are chiefly due.

The influence of sulphur, although not fully understood, is important. The soft bitumens usually contain much less sulphur than the harder ones. If they are at all rich in sulphur they, as a rule, become hard eventually.

Trinidad bitumen has a particularly high bromine absorption, amounting to 30 per cent., whereby about 12 per cent. of hydrobromic acid is liberated, indicating the presence of a large amount of unsaturated hydrocarbons. This figure for bromine absorption must be distinguished from those given by Malenkovie in the second of his methods of testing set forth in the preceding "Note" of this series. In this case the figure relates to the whole of the sample, whereas Malenkovie's refer to an extract of bitumen prepared from the sample as directed.

Dr. O. J. Steinhart gives the result of testing two samples, each sold as "best refined bitumen," and directs attention to the fact that one contained almost twice as much ash as the other:—

Moisture at 100° C.	1·18	...	.....
Soluble in carbon bisulphide	56·44	...	52·53
Insoluble in carbon bisulphide	16·36	...	.....
Ash insoluble in carbon bisulphide	26·29	...	46·40
	100·27		98·93

Mr. E. Kilburn Scott has recorded some of his experiences of bitumen in electrical uses. He has found that pure bitumen by itself was too costly for trough filling, and pitch by itself was not satisfactory, because it was liable to crack with the vibration from traffic passing over it. In his opinion, the best commercial result was a mixture of the two, having a specific gravity of 1·5 to 2. The kind of filling does not seem to matter much so long as it keeps out moisture and does not attack the lead covering or the cable insulation. A breakdown occurred on an extra high-tension feeder laid in iron troughing filled with bitumen. As a result of expansion and contraction, the cable crept in its troughing, and at a sharp corner it gradually pulled itself straight between two of the bridges, and became sufficiently decentralised to touch the inner radius of the troughing. The pull was so great, in fact, that the copper conductor actually decentralised in its own insulation. The viscosity is important, because, given sufficient pressure and time, any cable will move through a bituminous compound, just as a lump of pitch several inches in diameter will find its way by gravity through a 1-in. diameter hole. If a cable is laid over rising ground there is a tendency for the filling material to gravitate gradually downwards and leave the cable at the summit uncovered. There are often some places not filled in or leaks which will allow of this movement.

MACADAMISED ROADS AND DUST.*

ONE of the requirements of a macadamised road on which horse traffic is used is that it shall be slightly elastic. Theoretically an unyielding surface may be better for vehicles; but practically a considerable amount of wear will ensue both to the road and to the vehicle unless the road surface is slightly responsive to any jar. For the horse a slightly yielding surface is imperative. This vital requirement of elasticity is really one of the chief causes of the trouble experienced with dust.

It has been pointed out that a cubic yard of metalling 2 in. to 2¼ in. cube, when screened and laid down in regular layers of 6 in. thick, contains no less than 40 per cent. of interspaces. These interspaces have to be filled with smaller material, some of it gravel or sand, but most of it fine dust or mud, according to the state of the weather and the character of the road stone. The function of this soft intervening material is to form a cushion to preserve the stone from the heavy blows of the traffic and to absorb the shock that would otherwise be unpleasantly felt by the horse or the vehicle. The character of the intervening cushion thus becomes important, for if when the road surface dries it is converted into a fine mobile dust that is easily dispersed a stone gets kicked out, and an opening is made which, if not quickly attended to, will soon result in the disintegration of the road. The way in which some of the material used for metalling is affected by water adds to this process. It therefore becomes obvious that the best road surface will be that where the material filling the interspaces has a high specific gravity, is not easily pulverised by shocks, and is not reduced to fine dust or mud by the action of the weather.

Another common defect arising also from the same source is that a macadamised road surface rarely for long retains the even convex shape in which it was left by the steam-roller. The soft material interspersed between the stones will be greater in one part than in another; consequently, as it gives way or comes out, especially if a stone or two is loosened from the road surface, the road wears away and a hollow is formed.

It has been said, and is very generally believed, that motor-cars are the cause of dust. But motor-cars would not raise the dust if the dust were not already there, either on the surface or in the interstices of the metalling. Everyone will agree that the dust raised by cars is a great nuisance, making other road-users as well as residents by the roadside utterly miserable; but it is better to get at the cause of the trouble than blame the instrument, and the cause is undoubtedly the fine material that lies upon and between the metalling.

It has been pointed out by Mr. O'Gorman that the hollows and the irregularities of the surface are largely the cause of dust raised by motor-cars. It constantly happens that while one driving-wheel is making good and effective contact with the road the other wheel is skipping lightly into a hollow in which a dust puddle may be lying. When a vehicle is moving slowly the wheel has time to traverse the full contour of the hollow, but when travelling rapidly it bounds from the ridge into the midst of the hollow, spinning round meanwhile, and so acts like a brush directly it comes in contact with the dust. The effect of this action is very easily realised.

On every macadamised road there must always be some breaking down of the surface from the pounding of the horse's hoof and the grind of the tyre. The only way to deal with this is to get rid of it as quickly as possible, for it does no particular good to the road to leave it there, and it certainly does no good to the road-user or to residents by the roadside. Slow-moving traffic may not disturb it, but directly a motor-car or bicycle comes along the light debris is sent flying: whilst, if there is nothing else, the wind will see that it gets thoroughly distributed.

The more that sand and silicious material is used the less will be the dust produced. Sand, moreover, cannot so easily blow about in clouds, neither can it be churned into a fine impalpable dust, like limestone can be.

There appear to be three directions along which efforts may be made to reduce dust:—

(*a*) By treating the macadamised surface in such a manner as to retard the formation of dust or fix it when it is formed.

(*b*) By introducing another substance as a cushion between the metalling in place of the grit and dust with which the interstices are usually filled.

(*c*) To use as road material stone of a silicious or basaltic nature less liable to be broken down by wear or dissolved by moisture.

(*a*) The City Engineer of Bristol has very kindly furnished the results of experiments as to the relative cost of dressing the roads with different dust-preventing solutions. The experiments took place in Coronation-road, Bedminster.

The first preparation was spread on June 24, 1905. Subsequent applications were made on June 26 and 27 and July 4, 5, and 7, six applications in all. At the end of a week there were complaints of the dust rising, but after the fourth, fifth, and sixth applications the road stood fairly well until July 17, when the whole road had to be watered, and it was found necessary to resume the ordinary street-watering on July 29. The cost of this application worked out to 6s. 9½d. (or ·0136 of a penny per square yard) per day, as compared with 4s. 4d. (or ·0086 of a penny per square yard) per day had ordinary watering been adopted.

The second preparation was applied from July 8 to 17, altogether five applications. The dressing stood till August 17, no water being required during this interval except in channels, which were flushed out once a day from July 28. The cost worked out to 4s. 7d. (or ·0091 of a penny per square yard) per day, as compared with 4s. 10d. (or ·0096 of a penny per square yard) per day had the road been treated with ordinary water. Those who had formerly complained as to the street-watering both spoke and wrote of the good results.

No record was kept of the reduced cost of cleansing, but it is probable that there would be a saving as compared with ordinary street-watering.

In Liverpool records were kept in 1902 and 1903 of the cost of treating certain macadam roads with oil. The cost appears to have varied between ¼d. and ½d. per square yard, according to the amount of oil used, and Mr. Rathbone, from whose paper these particulars are gathered, states that the total reduction in the cost of cleansing and watering was from 13d. to 5·5d. per square yard for a period of twenty-one days. Apparently the treatment resulted in a distinct saving in maintenance as well as reduction of wear, but, on the other hand, the oil did not form a very pleasant surface for traffic, and the smell was complained of. In 1903 the oil was applied more carefully, and renewed at intervals of three weeks, and the cost was stated to be ·0022 of a penny per square yard per day, as compared with ·0033 of a penny per square yard per day, the cost of ordinary street-watering.

The difference in results obtained in Bristol and Liverpool is probably due to factors which have not been noted, such as the kind and quantity of traffic. No two roads are exactly comparable.

It is probable that the trouble from dust can be very much palliated on existing roads by the use of calcium chloride and other similar solutions without appreciably increasing the cost of watering, if at all. On the other hand, the best way to make dustless roads is to use better material. A bad material can never be made permanently satisfactory by simply fixing the surface dust.

(*b*) Treating the roads with a watering solution may be possible in urban, but, as a rule, it is altogether beyond the means of rural districts, and another method must be found. The dust nuisance has been successfully tackled by coating newly-rolled metalling with boiling tar and pitch. Immediately after the road is formed the tar and pitch is applied in a flat stream from a watering-pot. It is then dressed with fine flint grit, and allowed to stand a day or two for consolidation before the traffic passes over it. Even with mendip limestone, which is notorious for giving off dust, this method has been found to be successful.

Another example of the second way of overcoming the dust question is the use of tarred macadam. This has been tried for some years with more or less successful results. Tarred slag appears to have answered well in some of the busy thoroughfares of London. The tar, as in the previous case, is applied hot, the slag being also heated to dryness. Apparently better results have been obtained with slag than with limestone or basalt.

This method will probably be followed up still further, and there can be no reason why, in course of time, it may not become uniformly successful. It appears to aim in the right direction of substituting for dust an elastic and non-friable material as a cushion between the stones.

(*c*) Anyone who travels over the country will notice how much less dust there is where basaltic or silicious stone is used as compared with limestone, lias, or oolite. If every macadamised road could be made up with basalt the dust question would assume a very different aspect. It is not only that such roads are less easily broken down by weather, but the material, being of greater specific gravity, is not so easily moved by wind. The argument against the more general use of basalt, in districts remote from basaltic quarries, is its cost. But it does not necessarily follow that a material which is cheapest in first cost will be cheapest when the cost of maintenance is taken into account.

In Bristol we have about 234 miles of

* Part of a paper by Mr. A. P. I. Cotterell, M.Inst.C.E., F.S.I., read at the recent Bristol Congress of the Royal Sanitary Institute.

macadamised roads, of which thirty-two miles are repaired with basalt and the remainder with local mountain limestone. We have been considering the advisability of repairing an additional thirty-two miles with basalt.

The effect of the increased use of granite will be to increase the expenditure for four years, and afterwards to decrease it, so that on an average of thirteen years the actual additional outlay will be only 354*l.* per annum. Against this must be set the saving in cleansing and watering, which is always less with granite than with limestone, so that the probabilities are that the granite road will cost less to the ratepayers than the limestone one, although the limestone quarry that would be given up is worked by the city itself, and lies close to the river in one of the finest possible positions for supplying stone economically.

This may be an answer to the natural argument that expenditure in dust-prevention may be all very well for towns, but quite out of the question in the country, for in many parts it is possible, by means of a bold capital expenditure, to provide a better and less dusty road at practically no greater cost to the ratepayers, especially if a short-period loan can be obtained. The City Engineer has also kindly furnished results of some tests made by him into the wearing properties of different classes of stone. The first test was in Clarence-road, New Cut, where ten different kinds of stone were tried. Three basaltic areas outlasted the period of the test. The basaltic stones also gave off less debris as measured by the loads of slop removed.

BUILDING DANGERS:

A DEPARTMENTAL COMMITTEE APPOINTED.

THE Home Secretary has appointed a Departmental Committee to inquire into the dangers attendant on building operations, and to prepare a draft for regulations embodying the precautions which may, in their opinion, be desirable for the safety of the workers. The members of the Committee are:—

Mr. William Dawkins Cramp, I.S.O., Deputy Chief Inspector of Factories (Chairman).

Mr. John Batchelor (Operative Bricklayers' Society).

Mr. E. T. Jessup (Amalgamated Society of Carpenters and Joiners).

Mr. William Shepherd (London Master Builders' Association).

Mr. Alexander R. Stenning (Surveyors' Institution).

Any communications on the subject should be addressed to the Secretary, Mr. Leonard Ward, Home Office, Whitehall.

THE ROYAL SANITARY INSTITUTE.

THE following new Members and Associates have been elected:—

Members.

W. B. Barclay, L.R.C.P., M.O.H., Weymouth
H. M. K. Berridge, Long Eaton, Derbyshire
G. L. Butterworth, Birchington
A. Chaussé, M.P.Q.A.A., President, Province of Quebec Association of Architects, Montreal, Canada
Jean P. Decarie, M.D., Montreal, Canada
F. L. Dodd, M.R.C.S., L.R.C.P., L.D.S., D.P.H., London
G. T. Forrest, Newcastle-on-Tyne
H. J. W. Gidley, Victoria, Hong Kong
J. C. Haller, Carlton, near Nottingham
P. M. Harris, London
G. F. Hickson, Perth, Western Australia
W. M. Hope, D.P.H., M.O.H., Gloucester
J. A. Hutchinson, M.D., L.R.C.P., Quebec
W. Ingham, Port Elizabeth, S. Africa
W. Jennings, Leytonstone
R. King, Dundee, Natal
A. G. McAvity, Montreal
P. J. O'Brien, Edinburgh
H. Oldham, Perth, Western Australia
C. H. Parker, Mergin, Burmah
C. Phillips, London
P. F. P. Plomer, London
E. W. Rees-Jones, M.D., D.P.H., Lincoln
J. W. S. Seccombe, D.P.H., L.R.C.P., M.R.C.S., Devonport
W. Stringfellow, Ashbourne, Derbyshire
C. H. Thompson, M.A., M.D., London, W.
T. J. Underhill, F.C.S., Bromley, Kent.
I. Young, Balham, S.W.

Associates.

J. F. Bedford, Leeds
Miss M. A. Chappell, Barnsley
T. Clegg, Elland, Yorks
T. E. Davies, Leeds
P. E. Davy, Earlswood, Surrey
T. G. Easdale, Northallerton
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Miss A. Greenwood, Mytholmroyd, Yorks
J. T. Griffin, Chingford
R. H. Kilburn, Guisborough, Yorks
J. W. King, Bolton
A. Longbottom, Drighlington, near Bradford
Miss G. W. Martyn, Thornton Heath
Miss E. Miller, Southampton
J. Miller, Edinburgh
W. P. Northmore, Plymouth
D. J. O'Hal'oran, Hong Kong
W. G. Packer, Richmond
E. C. C. Prosser, Luton
Miss F. E. Relf, Frizinghall, near Bradford
Miss E. A. Roberts, Dumfermline, N.B.
Miss F. Rowbotham, Darton, near Barnsley
E. E. Ryder, Bushey
F. Seckerson, London
Miss S. K. Smithson, Dewsbury
Miss F. M. Studholme, Canterbury, New Zealand
G. E. Taylor, London
H. Wharton, Chester
S. W. Wingfield, London.

Correspondence.

OLD SURREY CHURCHES.

SIR,—Among the town-like village churches should be added the noble one at Lingfield, with its nave, aisles, and choir, nearly all of the same width and height, and mainly of the XVth century. Its lofty tower, unusually placed, is supported on two of its sides by a huge third buttress practically up to the parapet. The church has no transepts, thus giving a fine sweep of aisle with wide bays and a telling window effect.

Round the church are clustered some exquisite "timber-houses," including the celebrated "Guest Hall."

JOHN A. RANDOLPH.

REDNESS OF WATER FROM HOT-WATER SERVICE.

SIR,—I should be glad if you would kindly let me have your opinion on the following:—

A few months ago I fitted up a large house in the West-end, with a complete new hot-water service, using the ordinary iron steam barrel (not galvanised) throughout. Although the boiler and cylinder are both thoroughly cleaned out at frequent intervals, yet my customer complains that whenever the water is heated for baths, etc., it comes out of the taps heavily charged with rust, and leaves a deposit on the sides of the baths, basins, etc., which, through being constantly scoured, lose their surface. To my mind the redness of the water is due to its being overheated and actually boiled in the pipes, but I should like to know what you think, and if there is any remedy you can suggest. J. R. C.

*** We are afraid that the only effectual remedy for the complaint mentioned is to replace the black pipes by galvanised iron or copper pipes, which should always be used for hot-water services. It is also advisable to employ galvanised iron or copper boilers if complete protection is required against rusty water. To adopt ungalvanised iron pipes is simply to court corrosion and consequent discolouration of the water.—ED.

ST. NICHOLAS, GUILDFORD.

SIR,—I must protest against the unjustifiable attack on the architecture of St. Nicholas, Guildford, made by the contributor of "Old Surrey Churches."

This excellent example of modern Gothic was designed, I believe, by the late Mr. Ewan Christian (though I have also heard it attributed to S. Teulon), and is the only satisfactory example of modern ecclesiastical work in the town. It is in the Early French style, and would have done Mr. Street credit. The proportion of the nave and tower, and the charming grouping as seen from the east end, are as original as they are admirable.

Internally the decoration leaves something to be desired, but the delightful clearstory and excellent disposition of levels must surely strike any unprejudiced observer. In all respects this charming building contrasts most forcibly with the despicable new church of St. Saviour, in which the seeming impossibility of producing anything worse than the nave and chancel has been ingeniously achieved in the recently erected west end and spire.

For students of XIXth century architecture who are not disposed to speak of "nightmares" and stigmatise fine examples as "awful" perhaps I may mention four admirable specimens in the neighbourhood, viz., Fleet Church by W. Burges, Blackheath Church by Mr. Harrison Townsend, and Graffham Church and Hascombe Church by Woodyer.

Graffham also boasts a beautiful parsonage-house, designed by the architect of the church.

H. S. GOODHART-RENDEL.

BOOKS RECEIVED.

THE A B C DIGEST OF THE BUILDING BY-LAWS FOR THE COUNTY BOROUGH OF BOURNEMOUTH. By Ingalton Sanders. (Southampton: *Hants Independent* Offices, 45, Above-bar. Price 1s.)

QUAINT AND HISTORIC YORK: IN AND AROUND THE OLD CITY. From drawings by E. Ridsdale Tate, with Notes by George Benson. (York: E. R. Tate, 4, The Crescent. London: B. T. Batsford, High Holborn. Edinburgh: W. J. Hay.)

COMMERCIAL DRY DOCKS. By J. Mitchell Moncrieff, M.Inst.C.E. (Newcastle-on-Tyne and London: A. Reid & Co., Ltd.)

THE CLAYWORKER'S HANDBOOK. (London: Charles Griffin & Co., Ltd., Exeter-street, Strand.)

Illustrations.

BELFAST CITY HALL.

THE new City Hall which has been erected for Belfast was opened recently by the Lord-Lieutenant.

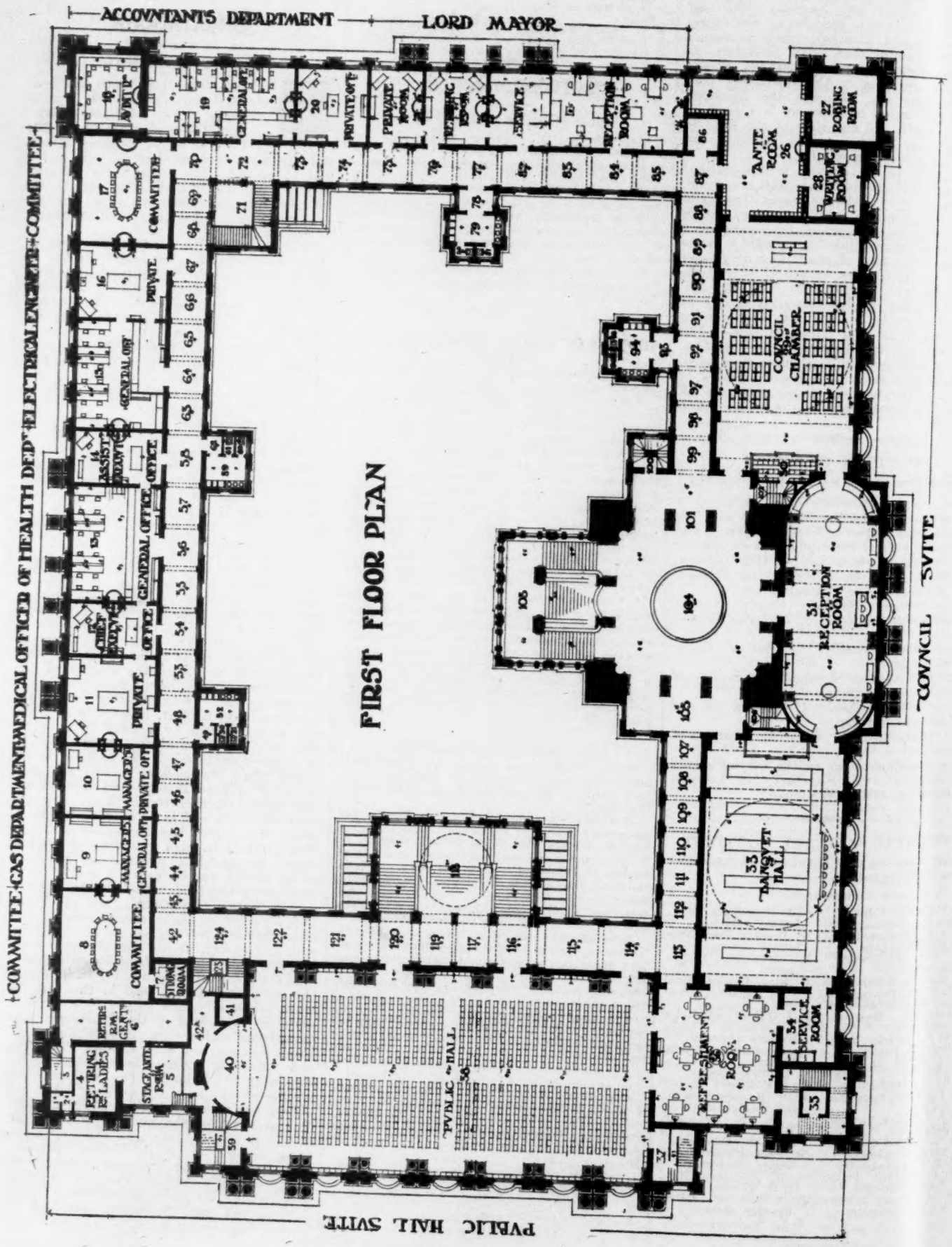
The Hall is situated on the site of the Old Linen Hall in Donegall-square, and covers an area of about an acre and a half of ground. The contract for its erection was entered into in 1897, and in the following year its foundation stone was laid by Lord Cadogan, the then Lord-Lieutenant of Ireland.

In form the Hall is quadrangular, with an internal courtyard. The main façade is 300 ft. long, and the sculpture which adorns it represents Hibernia wearing a mural crown and bearing the torch of Knowledge, the symbol of light and advancement, her right hand resting on a harp. Minerva is also represented, attended by Mercury and Liberty, and a female figure holding a bale of finished linen is included in the group. At her feet is seated another figure, with an Irish spinning-wheel, while the youth and energy of the country are expressed by the boy figures which the sculptor has introduced. The external façades are enriched with Ionic columns, and above the parapet at the four corners of the building the four angle towers rise to a height of 115 ft. The dome over the entrance is 173 ft. in height, and terminates in a stone lantern. The entrance-hall is approached through a stone *porte-cochère* and an octagon vestibule. It is 70 ft. by 40 ft., and rises to a height of 100 ft., terminating in a dome 42 ft. in diameter. The grand staircase is in Carrara, Pavonozzo, and Brescia marbles, the ceiling being treated with modelled plaster work. Seven three-light windows light the staircase. These windows are of stained-glass, on which the different stages in the history of the Corporation have been portrayed. The banqueting-hall, communicating with the reception-room, is 68 ft. long by 38 ft. wide, and is surmounted by a dome 36 ft. high. The walls are panelled to a height of 9 ft. in wainscot oak, carved. In addition to the Royal Arms, the windows in this hall show the arms of Lord Donegal and Shaftesbury. The council-chamber communicates with the reception-room, and is 68 ft. long by 38 ft. wide. The centre bay has arches springing from piers 17 ft. high in a dome of original design in modelled plaster, the two end pieces having curved panelled vaults. The chamber is provided with balconies for the accommodation of the public and the Press. It is arranged for the members of the Council after the style of the House of Commons, with a gangway, at one end of which there is a raised daïs for the Lord Mayor's chair.

In the great hall, which is 120 ft. in length, the ceiling is vaulted, and in three of the seven windows which supply it with light there are portraits of the Sovereigns who have visited Belfast—viz., King William III., Queen Victoria, and King Edward VII. The four remaining windows bear shields of the Provinces of Ireland. The hall provides accommodation for 1,000 persons, while the gallery will accommodate an additional 250. The architect of the building was Mr. A. Brumwell Thomas (London), the contractors being Messrs. H. & J. Martin (Belfast). The contractors for the stained-glass work were Messrs. Ward & Partners, Belfast. The cost of the building exceeds 300,000*l.* All the oak parquet flooring was laid by Messrs. Ellis Geary & Co., of London.

SKETCHES WITH THE ARCHITECTURAL ASSOCIATION EXCURSION.

THESE illustrations are given in connexion with the excursion of the Architectural Association to Stamford, a report of the first two days' proceedings of which appears on another page.



New City Hall, Belfast.

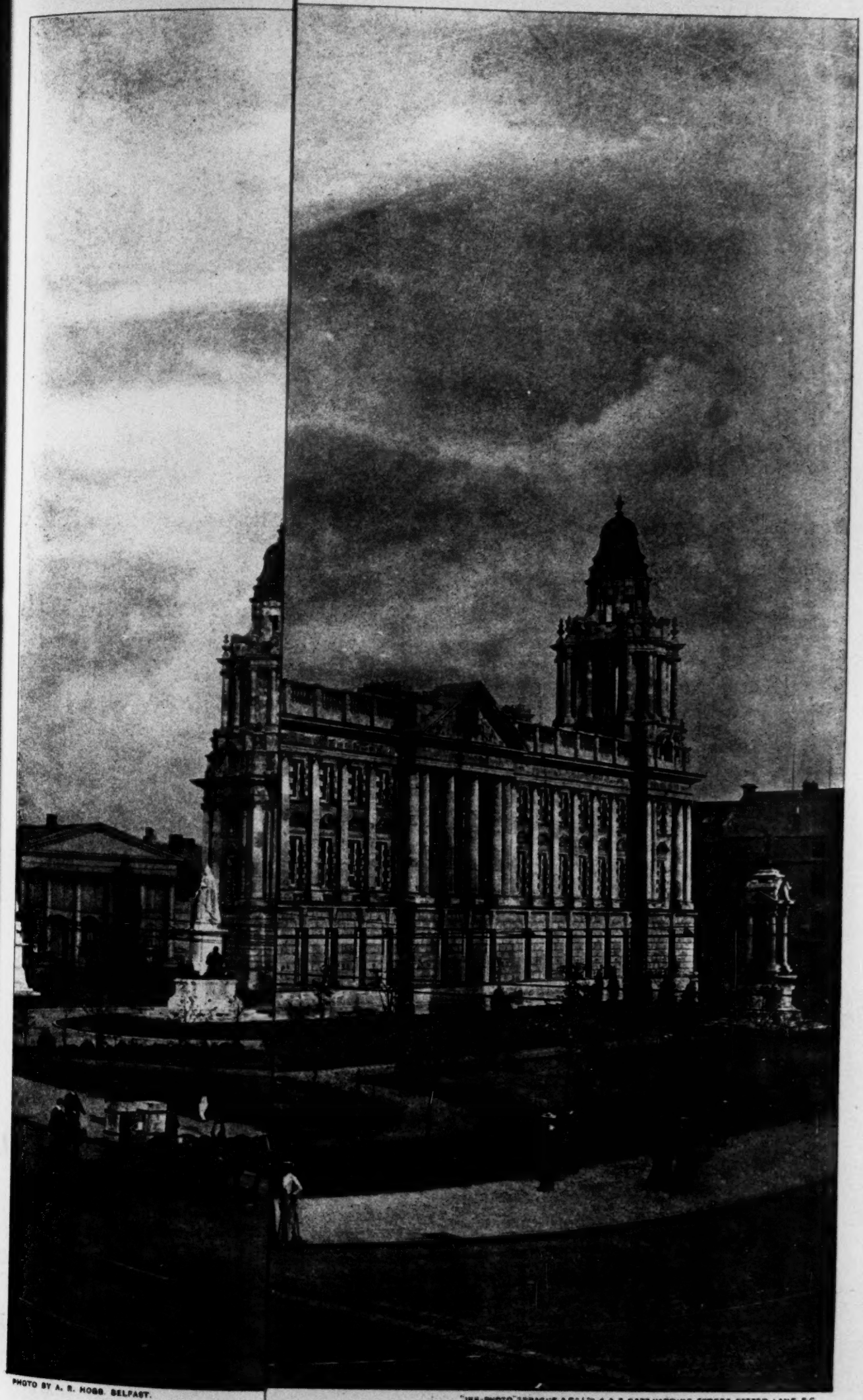


PHOTO BY A. R. HOGG, BELFAST.

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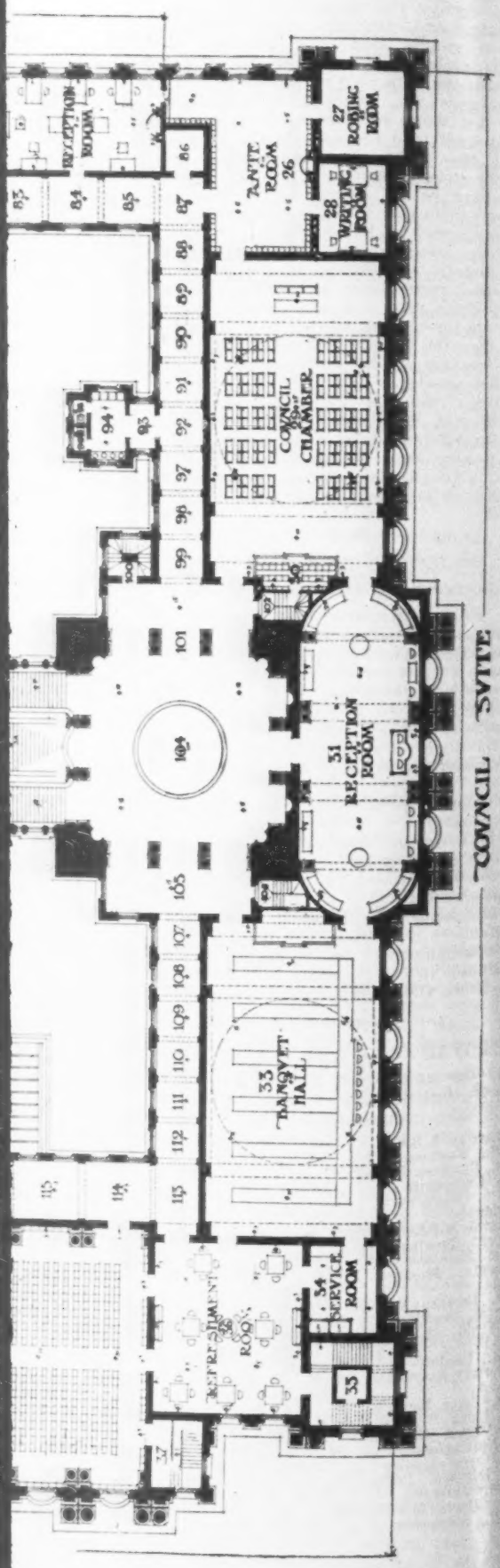
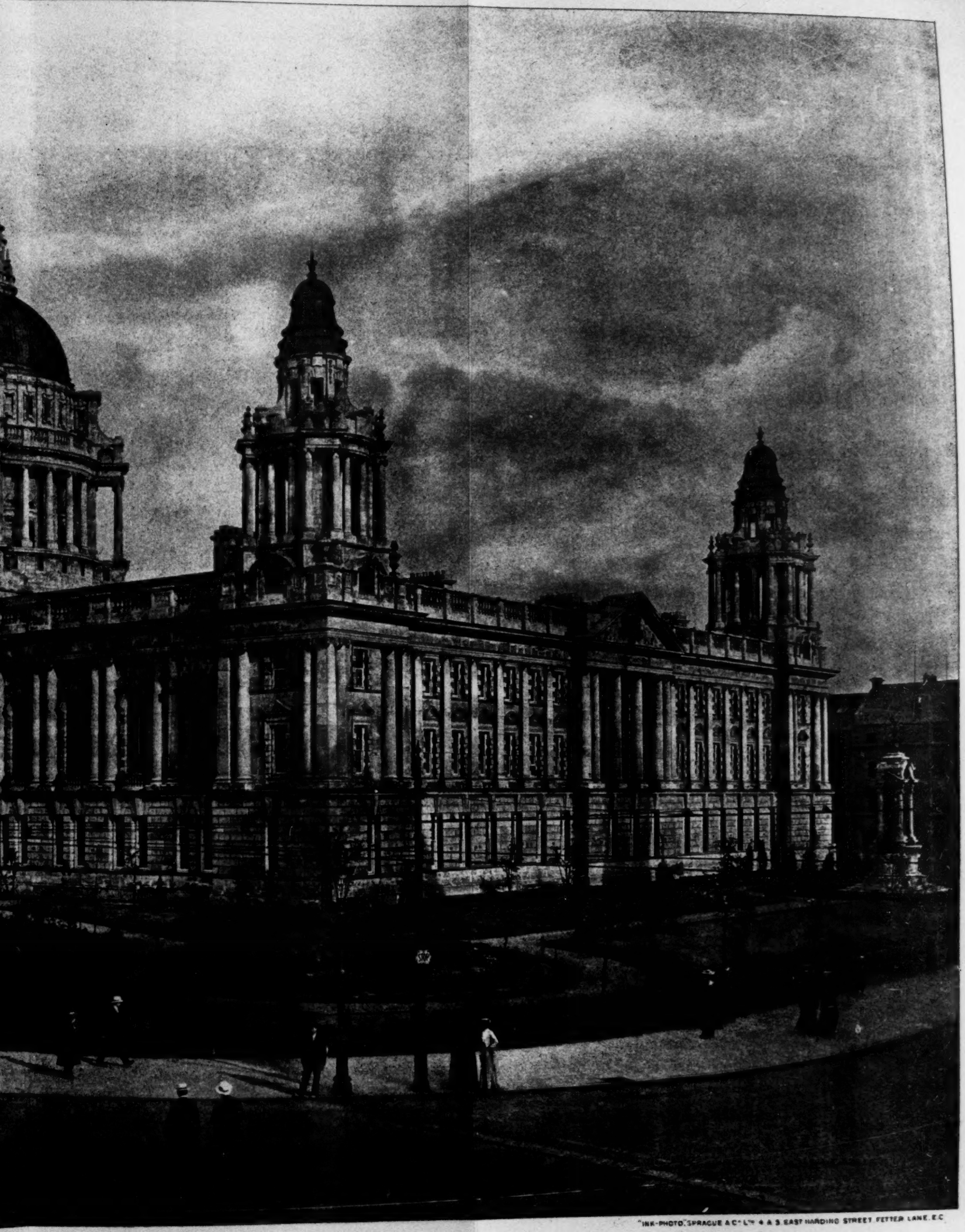


New City Hall, Belfast.

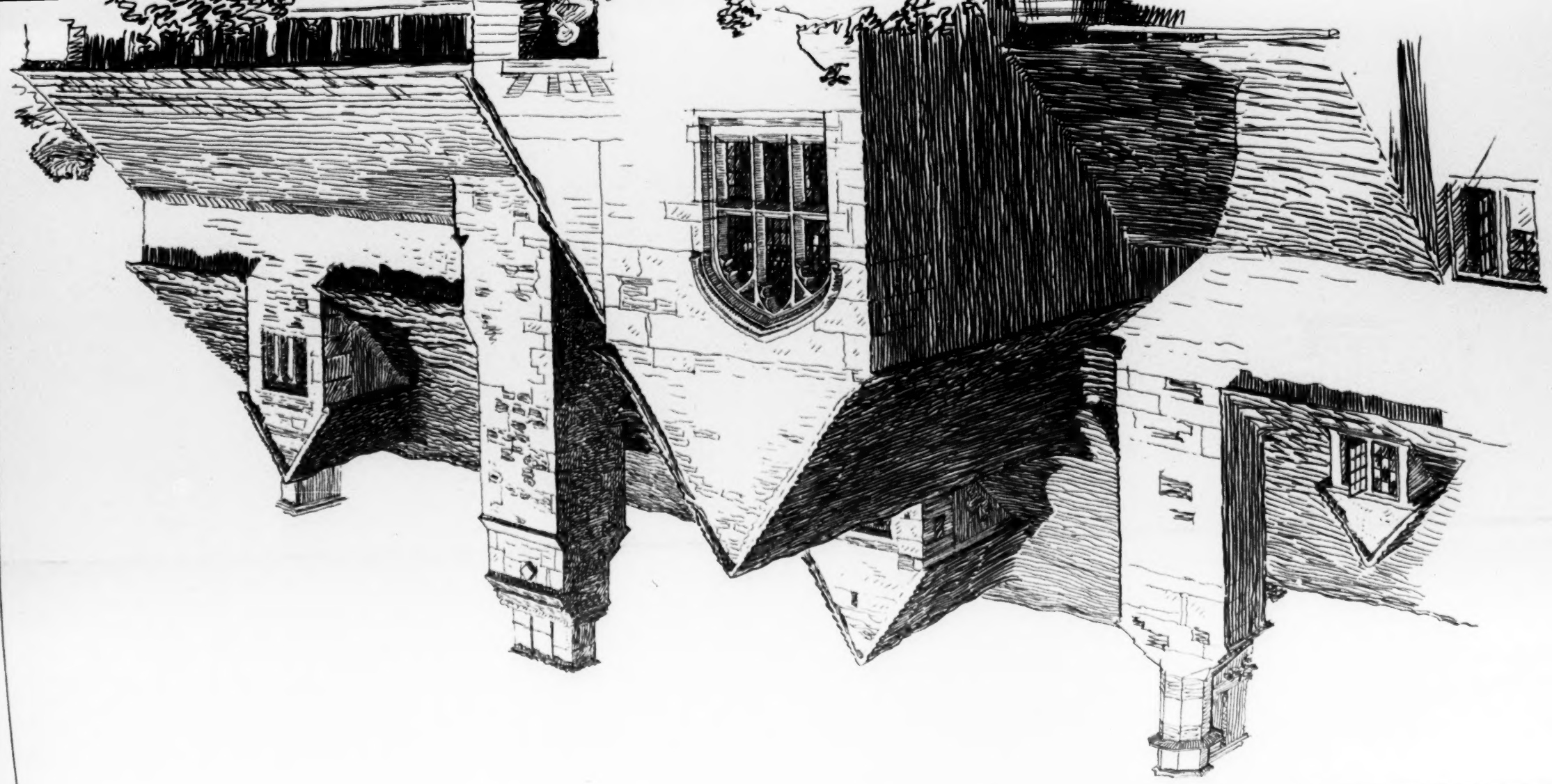
PHOTO BY A. R. HOGG BELFAST.

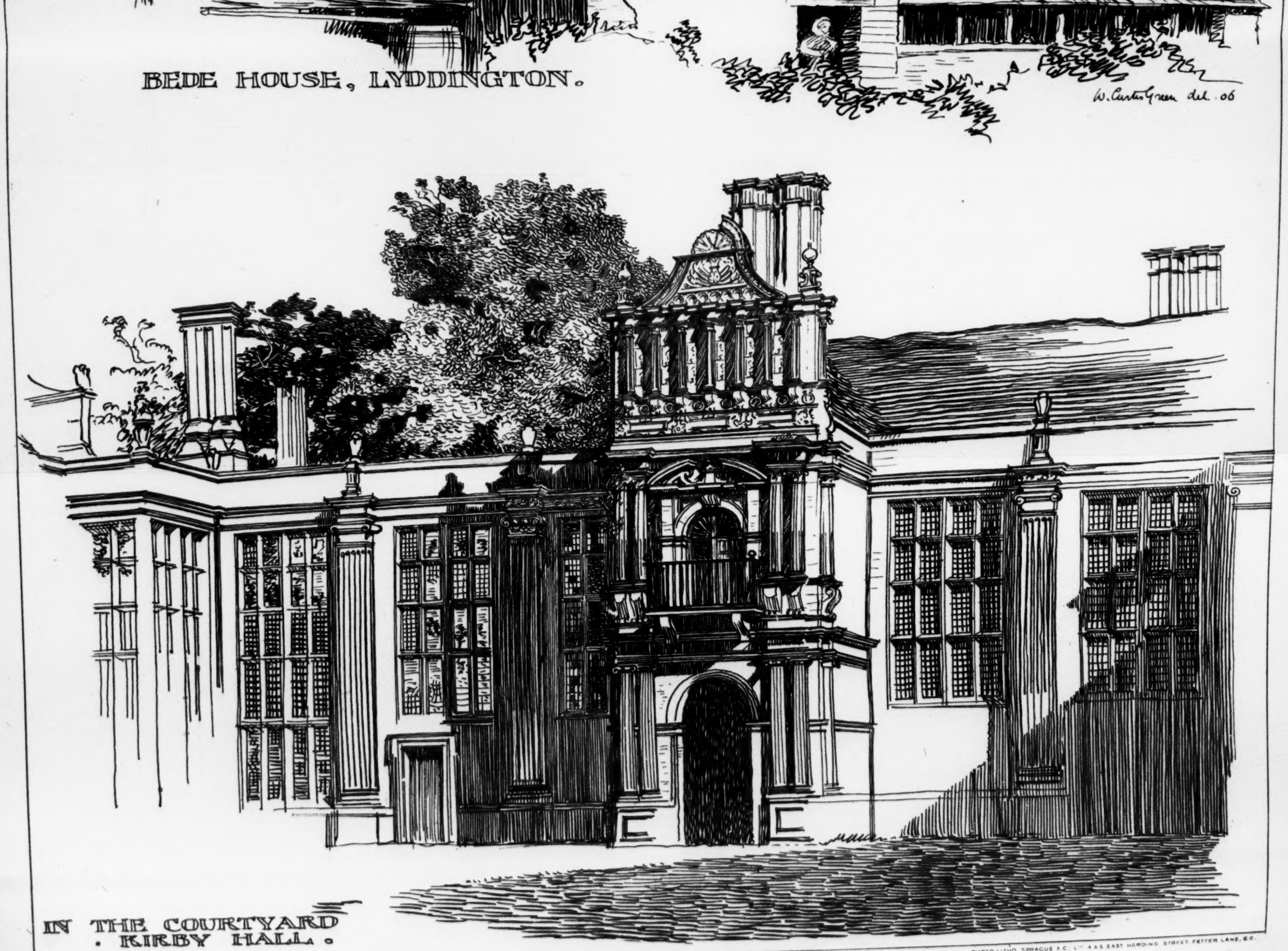
NEW CITY HALL, B



"INK-PHOTO," SPRAGUE & Co.ª L.ᵗᵈ 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

HALL, BELFAST.—Mr. Alfred Brumwell Thomas, Architect.



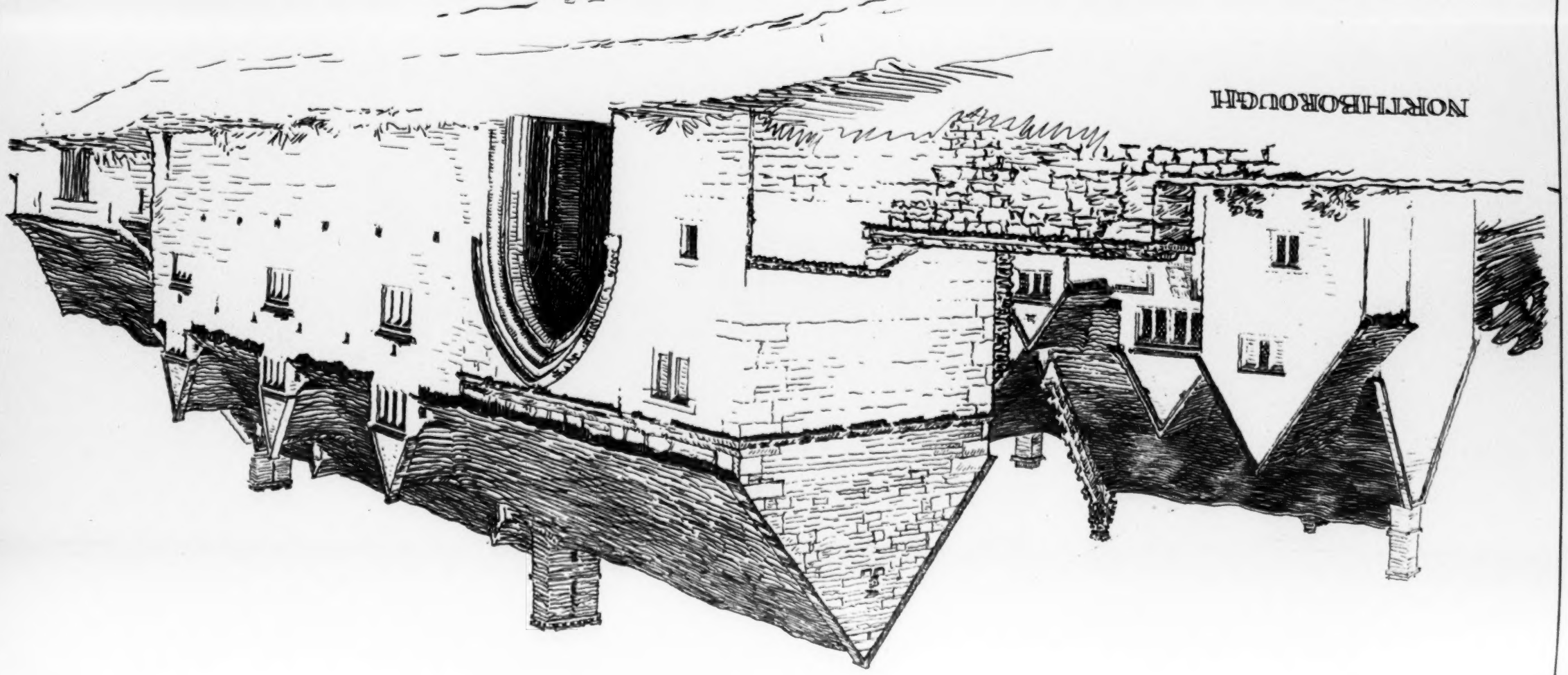


BEDE HOUSE, LYDDINGTON.

W. Curtis Green del. 06

IN THE COURTYARD
· KIRBY HALL ·

PHOTO LITHO SPRAGUE & C° LT° 455 EAST HARDING STREET, FETTER LANE, E.C.


NORTHBOROUGH

W. Curtis Green del. 06

FORMERLY THE HAYCROFT INN, STIBBINGTON.

PHOTO LITHO SPRAGUE & Co. Ltd. 435 EAST HARDING STREET FETTER LANE E.C.

A SHOP, HIGH STREET STAMFORD

FORESTERS INN, STAMFORD.

HARR

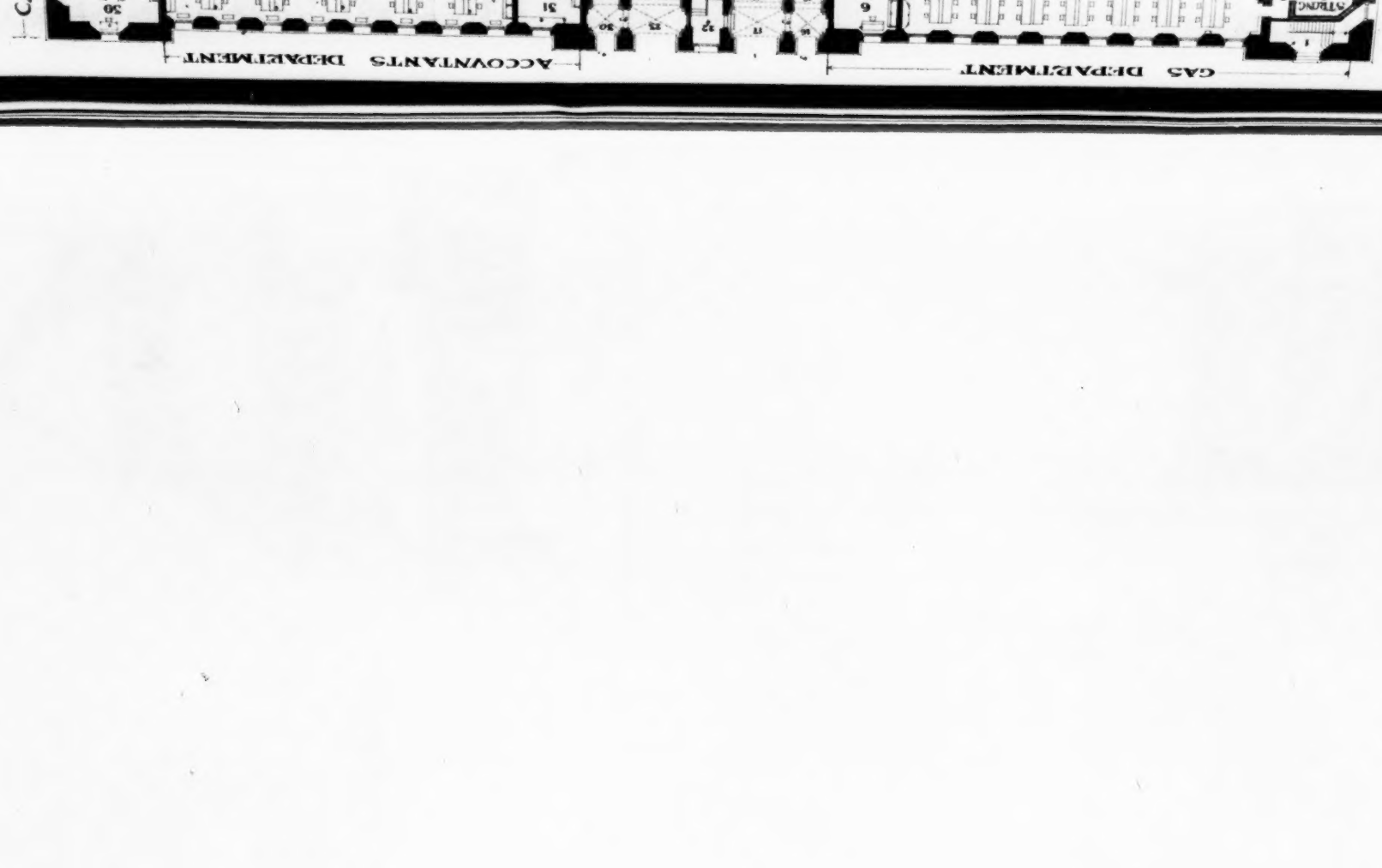
S·PAUL'S STREET, STAMFORD

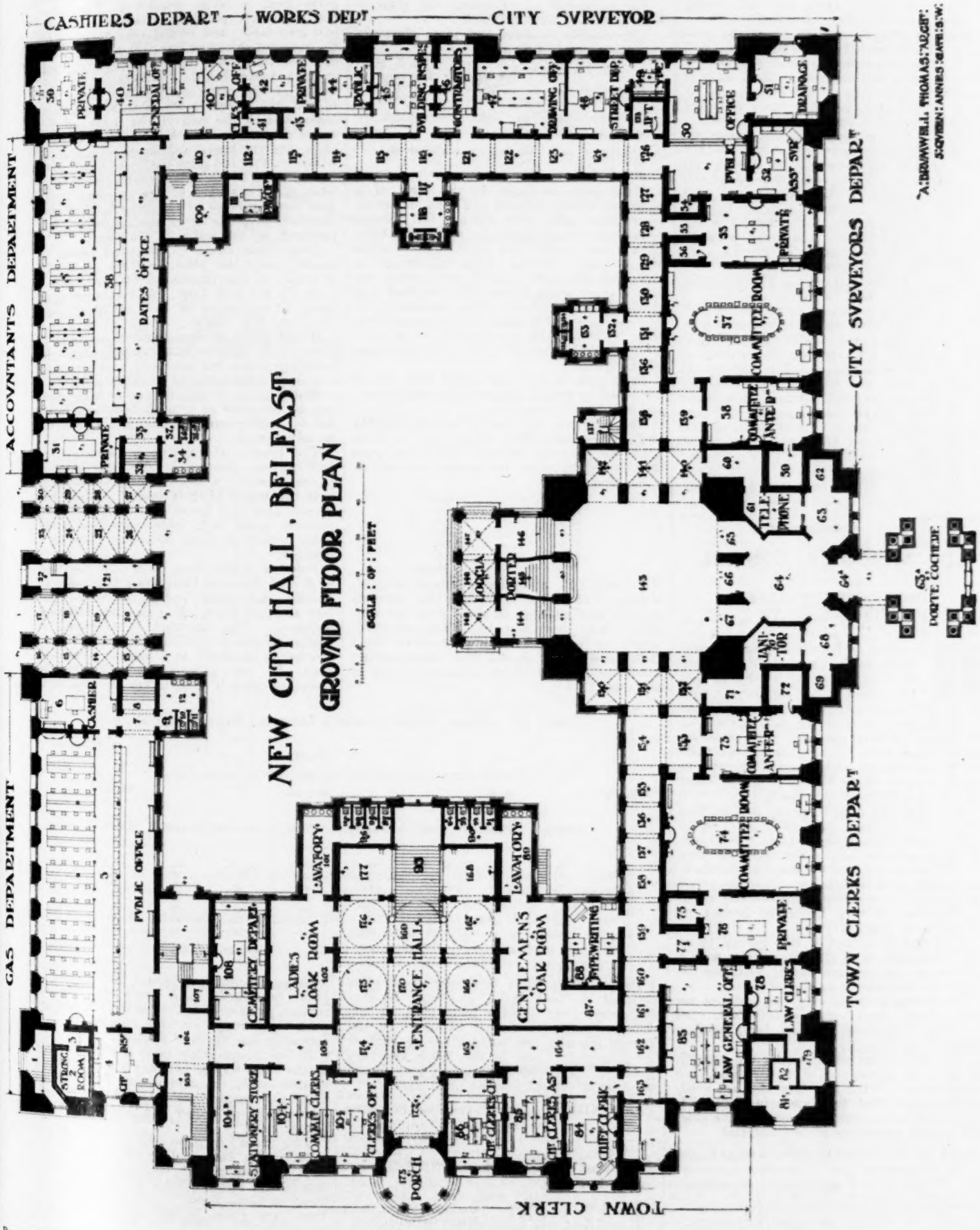
ARRINGWORTH

W. Curtis Green del. 06

S·PAUL'S STREET, STAMFORD.

PHOTO LITHO SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET FETTER LANE, E.C.


ACCOVNTANTS DEPARTMENT
GAS DEPARTMENT
STRAND



Brumwell Thomas, Architect.

Trade Catalogues.

MESSRS. CROMPTON & Co. send us their catalogue of small continuous current electric motors specially designed to meet the demand for a series of reliable machines of small power at a reasonable price. The motors are built in large quantities, strictly to gauge, and interchangeable. The armatures are of the slotted drum-wound type, the coils being "former" wound; the commutators are of hard-drawn copper, and the bearings self-oiling. The brush-holders are adjustable, and the machines are stated to be as complete in every electrical and mechanical detail as it is possible to make them. The motors are of the protected type, made in three standard sizes of ¼, ½, and 1 brake horse-power respectively, and can be applied as direct-coupled, or belt-driving, motors, according to the speed of the apparatus to be driven. In cases where very low speeds are required the motors are supplied with self-contained spur or worm reduction gears. Judging by the illustrations and particulars contained in the catalogue these motors constitute a well-designed series that ought to become very popular among small power users.

We have received from the Simplex Conduits Company, Ltd., a leaflet describing a novel method of mounting switches and ceiling roses. The flush mounting-box used is so constructed that the channelling of the brickwork required for the electric wiring is reduced to a minimum. The fitting is separated from the box by an insulating-disc ⅛ in. in thickness, and so it is quite suitable for use at the pressures now customarily used. The box is of polished and lacquered brass, and has a neat appearance. As these boxes are for use with a concealed system of wiring, and as no plastering is required, they will be appreciated by many who have to plan the electric wiring of buildings.

The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED.—V.

12.—*Glass.*

IN ordinary buildings glass is only incidentally a roof covering material, occurring chiefly in lanterns and other forms of roof lights. There are, however, many buildings where extensive roof areas, such as those of courtyards, winter gardens, and conservatories, have to be glazed throughout their full extent, and others of special character in which glass is either the only or the chief covering for the roof framework.

Engineers who design railway-stations and large steel buildings may have occasion to employ glass on a scale of great magnitude, but it is probable that in the aggregate they do not use so much of the material for roofing purposes as architects. Therefore, we are justified in regarding glass roofing as an essential and a very important branch of architectural practice.

Glass may be defined in very general terms as a compound of an alkaline silicate, with a silicate of an alkaline earth, and one or other of the metallic oxides.

For roofing purposes only two varieties are used—*sheet glass* and *plate glass*, the chemical composition of these being similar, although not actually identical.

Very little is known concerning the strength of glass as a material of construction, but consideration of the few data that are available suggests that the values in Table XI. may be taken as roughly indicating the chief mechanical properties of the material.

TABLE XI.—APPROXIMATE STRENGTH OF GLASS.

——	Sheet Glass.	Plate Glass.
	per sq. in.	per sq. in.
Tensile strength	2,500 lb.	2,850 lb.
Compressive strength	30,000 lb.	31,000 lb.
Transverse strength...	1,500 lb.	1,700 lb.

While the compressive strength of glass is usually ample, the weakness of the material is to be found in its low resistance to transverse stress, a deficiency which is particularly marked when the load is sudden'y applied or rapidly increased.

Experiments by M. Grenet show that the resistance of glass to transverse rupture varies within wide limits, since in accordance with the speed of loading the strength may vary in the proportion of 1 to 4.* It is evident, therefore, that a good deal of latitude must be allowed in all calculations relative to the resistance of glass sheets applied as slabs.

The coefficient of expansion for glass is from 0·0000048 to 0·00000527.

The weights of sheet and plate glass are approximately as follows:—

	Per cub. ft.	Per sq. ft. 1 in. thick.
Sheet glass	158 lb.	13·17 lb.
Plate glass	172 lb.	14·34 lb.

The percentage of light intercepted by glass is as stated below:—

Sheet glass.....	⅛ in. thick	22 per cent.
Polished plate ...	¼ in. ,, ...	13 ,,
Rough plate	¼ in. ,, ...	30 ,,

Sheet Glass is blown in the form of a hollow cylinder, the end and neck of which are removed, and, while still hot, the cylinder is cut open longitudinally by a diamond fixed upon a long handle and guided by a wooden straight-edge. Having been placed in a flattening kiln, the split cylinder opens out into a sheet which is carefully annealed and gradually cooled down. The dimensions of the sheets made in this manner range from 45 in. to 85 in. long, and from 34 in. to 49 in. wide, according to the quality and thickness of the glass.

Sheet glass is sold per square foot, but is described by weight in ounces per square foot, and not by thickness.

The following are the recognised weights and the corresponding thicknesses of sheet glass, but it should be noted that 15-oz. glass usually weighs 16 oz. per square foot, and is $\frac{1}{32}$ in. thick:—

Weight.	Thickness.
15 oz.	$\frac{1}{32}$ in.
21 oz.	$\frac{1}{24}$ in.
26 oz.	$\frac{1}{20}$ in.
32 oz.	$\frac{1}{16}$ in.
36 oz.	$\frac{3}{32}$ in.
42 oz.	$\frac{1}{8}$ in.

Table XII. gives the maximum lengths, widths, and areas in which the different weights and qualities of sheet glass are supplied. Any sheet may be of the maximum length or width, but no product of these dimensions must exceed the corresponding maximum area for which values are stated in the table.

TABLE XII.—SHEET GLASS, MAXIMUM LENGTHS, WIDTHS, AND AREAS.

Weight.	Quality. Best.			Second.			Third.		
	Length.	Width.	Area.	Length.	Width.	Area.	Length.	Width.	Area.
oz.	in.	in.	sq. ft.	in.	in.	sq. ft.	in.	in.	sq. ft.
15	55	38	13	55	38	13	55	38	13
21	75	46	20	85	49	22	85	49	22
26	70	44	19	75	46	20	75	46	20
32	70	44	19	75	46	20	75	46	20
36	65	42	17	65	42	17	65	42	17
42	60	40	15	60	40	15	60	40	15

Patent Plate Glass is simply sheet glass polished on both sides, and may be distinguished from genuine plate glass by the different shape of the air bubbles. In the former material the bubbles are of oval or irregular form, and in the latter they are spherical. The surface of patent plate is not so plane as that of genuine plate glass.

TABLE XIII.—PATENT PLATE, OR POLISHED SHEET GLASS.

No.	Thickness.	Weight per sq. ft.	Size of Sheets.
1	$\frac{1}{16}$ in.	13 oz.	Maximum length, 50 in. Maximum width, 36 in. Maximum area, 13 sq. ft.
2	$\frac{1}{12}$ in.	17 oz.	
3	$\frac{1}{10}$ in.	21 oz.	
4	$\frac{1}{8}$ in.	24 oz.	

Patent plate is made in two colours, *crystal* and *extra-white*, each of *best*, *second*, and *third* qualities, denoted by the letters B, C, and CC, respectively. For glazing purposes, the crystal variety is to be recommended as it is more lustrous and, being harder, less liable to be scratched than the extra-white glass.

The average weight and dimensions of patent plate glass are contained in Table XIII.

Plate Glass is made by pouring molten glass from a large crucible or "melting-pot" upon the polished surface of a heated cast-iron table, and rolling out the mass to the required thickness by means of a polished cast-iron roller, very much as dough is rolled upon a pastry-board. The thickness and width of the plate are regulated by strips of cast-iron bolted to the table, so that they come beneath the roller. The depth of the strips determines the thickness of the glass plate, and the lateral spacing of the strips its width. After the plate has been rolled, it is moved to an adjoining table, and thence by a wire gauze conveyor to the annealing kiln. The lower surface of the plate is dull and crinkled, and the upper surface wavy, but polished, by the action of the roller.

Plate glass made as described above is termed *rough-cast plate*, or *rough plate*. It is rolled in the thicknesses of ¼ in., ⅜ in., ½ in., ¾ in., and 1 in., the maximum sizes being 60 sq. ft., ¼ in. to ¾ in. thick, and 40 sq. ft. 1 in. thick.

Rough plate is strong and cheap, and is particularly suitable as a roofing material in buildings where the interception of a part of the light constitutes no disadvantage.

Rough plate ground on one or both sides can be obtained at a small additional cost, but for roofing purposes this variety possesses no advantages.

The process of grinding is performed by bedding one plate on a table, and fixing a second plate to a movable arm arranged so that the upper plate is pressed against and moved over the lower one. Thus the two surfaces grind each other, sand and water being sprinkled upon the lower plate as a medium.

Polished Plate Glass, generally described as *British Polished Plate Glass*, is of superior quality, cast, rolled, and ground in the same way as rough plate. It is then smoothed and polished. The operation of smoothing is similar to that of grinding, except that emery powder is employed as a medium instead of sand. In the process of polishing, the smoothed plate is fixed to the top of a table with reciprocating movement, and caused to pass backwards and forwards beneath rubbers faced with felt or leather, the medium used being rouge, or "red raddle," as it is termed in the North of England.

Rolled Rough Plate Glass is manufactured in the same way as ordinary plate, but on a smaller scale, the molten glass being ladled from the crucible instead of being poured. The plates are smaller and thinner than cast plates.

This variety of plate glass is rolled upon a table having lines or flutes cut upon the surface, or upon a plain table, and finished by means of a lined or fluted roller, and is supplied in three forms of which full-size sections are given in the figures mentioned below:—

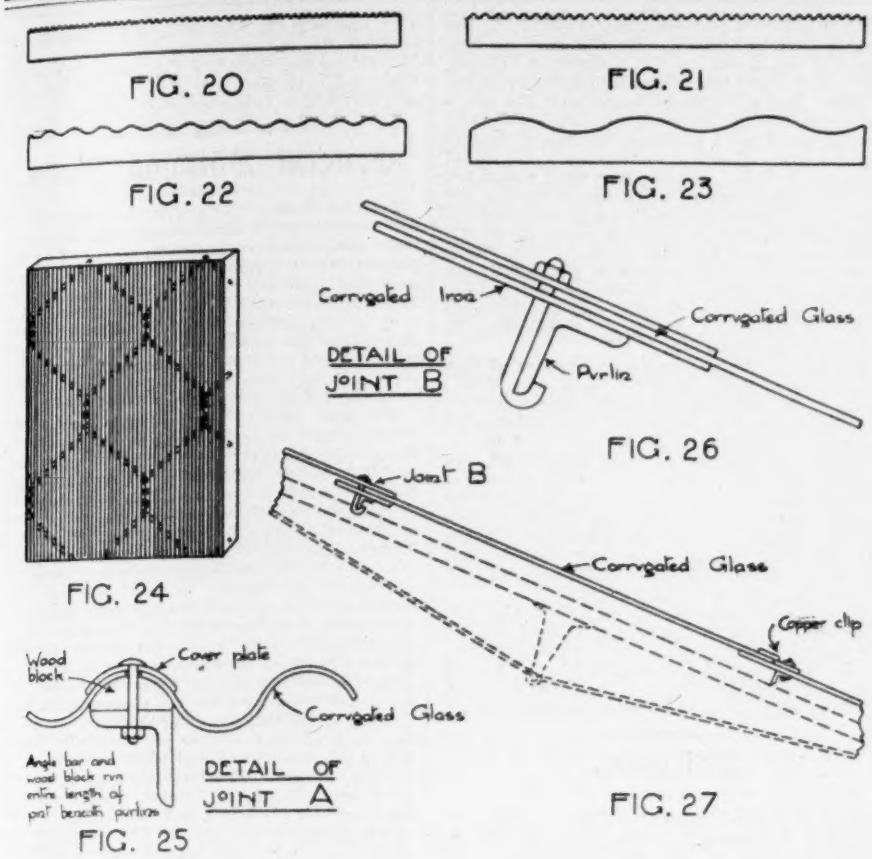
"*Plain*," Fig. 20, with closely-spaced parallel lines on one side.

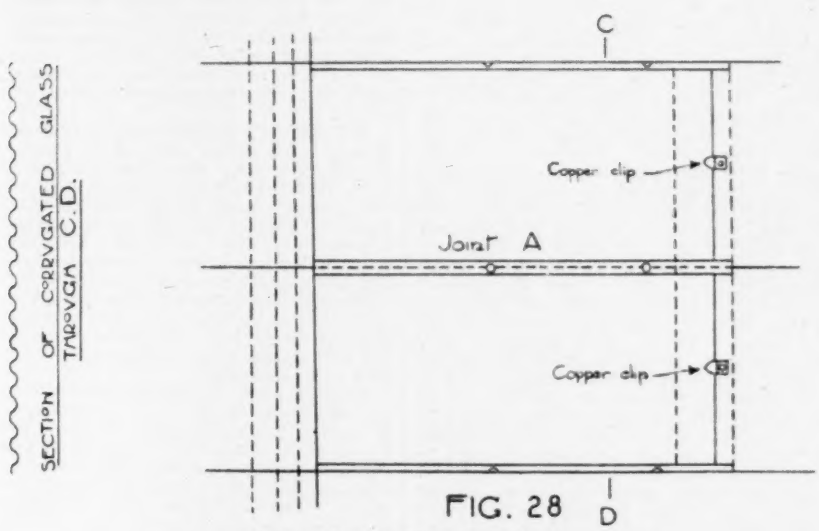
"*Fluted*," Fig. 21, small pattern, with about eleven flutes to the inch.

"*Fluted*," Fig. 22, large pattern, with about four flutes to the inch.

The thickness, weight, dimensions, and

Bulletin de la Société d'Encouragement pour l'Industrie Nationale, June, 1899.





Illustrations to Student's Column.

limiting area of rolled rough plate are given in the subjoined table.

TABLE XIV.—ROLLED ROUGH PLATE GLASS.

Thickness.	Weight per sq. ft.	Maximum Dimensions.		
		Length.	Width.	Area.
in.	lb.	in.	in.	sq. ft.
¼	2	110	42	25
⅜	3	110	44	25
½	4	110	44	25
¾	6	100	42	25

This glass is well adapted for glazing roofs of all kinds where translucency rather than transparency is necessary. The large-fluted form is especially suitable for roofs of considerable area.

Rolled plate corrugated on one side is made by Pilkington Bros. in sheets up to 110 in. long by 36 in. wide by ¼ in. thick at the bottom of the flutes, and with a maximum thickness of about ⅜ in. This glass, of which Fig. 23 is a section, is very suitable for roofing purposes, especially where ample light is required.

Pilkington's Patent Wired Glass is plate glass in which 24 S.W.G. wire netting of about ⅞ in. mesh is embedded, as represented in Fig. 24. Being hermetically sealed in the glass, the metal is effectively protected against corrosion, and the additional strength afforded by the reinforcement enables the glass to resist heat and blows that would fracture ordinary glass. One special advantage possessed by the combination is that even if the glass is cracked the pieces are held in position so that they cannot fall. This is a strong recommendation of the material for roofing purposes.

The valuable fire-resisting properties of wired glass have been demonstrated by the tests made upon it in July, 1905, by the British Fire-Prevention Committee, as well as by practical experience with similar material at the Baltimore fire and elsewhere.

For use in roofwork, wired glass is rolled in "plain plate," about ¼ in. thick, in sizes up to 110 in. long by 36 in. wide.

Pilkington's Corrugated Glass is made for glazing without frames in corrugated iron or zinc roofs, and is capable of bearing a much greater weight than glass having a plane surface.

It is made with corrugations 3 in. and 5 in. wide, and so can be substituted for any required area of roofing sheets.

Corrugated glass is procurable in 21-oz. and 32-oz. sheet glass in squares from 48 in. to 62 in. long, and up to 27 in. wide; and in $\frac{5}{16}$ in. rolled plate in lengths of 60 in. and 70 in., and up to 27 in. wide.

Figs. 25 to 28 illustrate the method of fixing this form of glass in corrugated iron roofs.

Glass Slates are made in sheet and rough-rolled plate glass—plain, small fluted, and large fluted—of the sizes and thicknesses stated in Table XV., and are very useful in parts of a roof where a small amount of light is desired. They are laid among the natural slates and secured by wooden pins, for which holes are provided.

TABLE XV.—GLASS SLATES (IN 16-OZ. TO 32-OZ. SHEET, AND ⅛-IN. TO ¼-IN. PLATE).

Designation.	Nominal Size.
Duchesses	24 in. × 12 in.
Duchesses (small)	22 in. × 12 in.
Countesses	20 in. × 10 in.
Viscountesses (wide)	18 in. × 10 in.
Ladies (wide)	16 in. × 10 in.
Ladies	16 in. × 8 in.
Doubles	13 in. × 7 in.

Glass Tiles are made of sheet and rough-rolled plate glass—plain, small fluted, and large fluted—in sizes to correspond with those of pan, plain, Roman, corrugated, and angular tiles so that they can be worked into roofs to save the expense of framed skylights.

The substance per square foot is the same as for glass slates.

LONDON BUILDING ACT TRIBUNAL OF APPEAL:

MR. HENRY THOMAS TUBBS, J.P., *v.* THE LONDON COUNTY COUNCIL.

ON Friday last week at the Surveyors' Institution, Great George-street, Westminster, the Tribunal of Appeal heard an appeal by Mr. Henry Thomas Tubbs, J.P., under sect. 22, subsect. 1, of the London Building Acts (Amendment) Act, 1905, against the conditional grant by the London County Council, by their notice dated June 1, 1906, of their approval of the means of escape in case of fire as shown on the plans submitted by the applicant on May 2, 1906, for the approval of the London County Council, in the matter of the erection of new buildings at 13 and 15, Leather-lane, E.C.

Mr. F. F. Daldy appeared for the appellants, and Mr. Moresby White for the London County Council.

Mr. Daldy, in opening the case, said that it was the first of the kind that had come before the Tribunal and it was a very important one. Under the Act of 1905 the London County Council were to prescribe what provisions they thought necessary for escape in case of fire, both in old and new buildings, but an appeal lay against their decision to that Tribunal. Until a man got his certificate he was prevented either from letting or occupying the premises. In the present case the superintending architect of the London County Council had approved the means of escape as submitted on plans sent in by his client, but subject to certain conditions, and it was those conditions he appealed against.

At this point Mr. White took the technical objection to the appeal being heard that the appellant had not given the notice prescribed under sect. 145 of the Act. He contended that the deposit of the plans was not sufficient, although he admitted that they gave much of the information which was required to be given in the notice.

A long legal argument took place and in the end the Tribunal decided against Mr. White and directed the appeal to proceed.

Mr. White said that the point was a very serious one for the London County Council, and he should ask the Tribunal to state a case.

The Chairman said they were bound to state a case on a legal point, but the Tribunal were of opinion that the point ought not to have been raised in this case.

Mr. Daldy then proceeded with his opening statement. He explained that the building was a rebuilding of two old buildings and was being so constructed that a very large portion was given up to staircases that would stand long after the rest of the premises had been gutted by fire. There was no substantial risk of the staircases being rendered impassable by smoke in the event of fire. The London County Council wanted them to provide lobbies on each floor with direct ventilation to the outer air. Such lobbies were not only unnecessary but would prove a positive danger to those employed in the building in winter time, as it would necessitate passing from a warm room into an ice cold lobby.

Mr. P. B. Tubbs, the architect for the appellant, stated that the premises were well on towards completion. The total height of the building was 35 ft. above the pavement level. The floors were of steel and concrete construction throughout—the floor boards, the battens on which they rested and the roof were the only combustible materials on the premises. The lobbies that the London County Council wanted them to provide were not necessary to provide a

means of escape from fire, as there was to be a concrete staircase out on to the roof.

The Chairman said that they had no plans before them showing a staircase on to the roof, and if Mr. White objected he was afraid they could not take that into their consideration.

Mr. White replied that he did not think he had any legal power to give his consent to the Tribunal adjudicating on something that was not before them. He would be quite willing to an adjournment in order that the plan of the top floor might come before a committee of the Council, because, of course, if they had got an alternative means of escape by the roof, it might be that the smoke lobbies would not be necessary.

Mr. J. Douglass Mathews, architect, gave it as his opinion that the smoke lobbies would be of no practical use whatever, and that they might act as an inlet for smoke instead of an outlet.

Mr. Ernest Flint, architect, and Mr. J. F. Dane, late engineer to the Metropolitan Fire Brigade, gave similar evidence, the latter giving it as his opinion that the smoke lobbies might constitute an added source of danger in the event of fire by creating a draught.

Mr. White addressed the Tribunal on behalf of the London County Council, contending that as the staircase was the only means of escape from the building in case of fire, it was their duty to see that that one means of outlet was made as effective as possible. He should call witnesses who would say that the best way to do that was by the provision of the smoke lobbies which the superintending architect had required to be provided here.

At this point the further hearing of the appeal was adjourned until Tuesday.

On the resumed hearing of the appeal, Mr. Morseby White called Mr. J. C. Strauson, who said that he was assistant architect in the escape section of the London County Council, which was the department that dealt with the means of escape from fire. Witness had had over seventeen years' experience in the matter. They had settled hundreds of cases amicably under the Act, and this was the first appeal. When the plans were deposited on May 2 he had not the faintest idea that the building was practically erected. Smoke lobbies were being erected or had been erected in at least thirty or forty buildings in London, and experience had shown that the workpeople did not suffer from draughts through them. His opinion was that smoke lobbies would intercept the smoke in case of fire and prevent it getting out on to the staircase. In the building in question the only means of escape was by the staircase. If Mr. Tubbs would provide an alternative means of escape, they would prefer that rather than smoke lobbies, but with only the staircase to rely on, they regarded the lobbies as absolutely necessary.

Replying to the Tribunal, witness said that these smoke lobbies were first adopted in 1903, but there had never been a fire in a building which contained one, so as to put them to a test. He understood that the Americans used them largely. The extra cost of carrying out the requirements of the London County Council would only be 92*l*.

The Chairman suggested that it would be very useful to the Tribunal if an experiment was made by filling a room with smoke and observing how these ventilating lobbies really acted. At present they had only theory to work upon, and it would be a very serious matter to put owners to the expense of these lobbies if they were no good.

Cross-examined by Mr. Daldy, witness said that the London County Council did not regard a staircase leading on to the roof as a second means of escape; such a staircase was only regarded as valuable to the top story.

Mr. John Slater, F.R.I.B.A., gave it as his opinion that in a building like the one in question it was not unreasonable for the London County Council to ask for these smoke lobbies, in lieu of an alternative means of escape. In modern buildings constructed of fireproof materials there was really very little danger to be apprehended from fire; the main risk to be guarded against was getting the staircase smoke blocked. These ventilating lobbies would, in his opinion, diminish that risk.

Cross-examined, he had had no practical experience that would warrant him in saying that these smoke lobbies would be effective, but it was certain that they were an additional precaution.

Mr. H. D. Searles Wood, past Chairman of the Board of Examiners of the R.I.B.A., and past President of the Architectural Association, said he agreed with the evidence of the last witness. In the event of a fire breaking out in a room provided with a smoke lobby, the smoke would go out through the opening into the street and would give an alarm.

Mr. Sidney Gamble, second officer of the Metropolitan Fire Brigade, also gave evidence in favour of smoke lobbies.

Replying to the Tribunal, Mr. Gamble said it was possible that the British Fire Protection Committee might make the suggested experiment to see whether smoke lobbies possessed the advantages claimed for them, but the experiment would have to be very carefully conducted to be of any use.

Mr. White then addressed the Tribunal for the London County Council. He said that the real reason of the appeal was the question of expense, but he had shown that it was only a matter of 90*l*. or 100*l*. If the Tribunal thought that the carrying out of the conditions of the London County Council would tend to lessen the risk of danger from fire to the ninety or more persons who would be in the building, he was sure they would not allow the consideration of expense to stand in the way. The Council was willing to give and take in these matters, but the attitude taken up by Mr. Tubbs was one of hostility to all the conditions. If the conditions were onerous it was due to the appellant putting up his building without telling the Council anything about it, and the Tribunal could not take that fact into consideration in arriving at their decision.

Mr. Daldy, for the appellant, contended that the question really resolved itself into this—whether the difference between smoke lobbies and the single door amounted to a substantial increase in the risk to people employed in the building. This case would create a precedent, and the Tribunal was asked to say on mere theoretical evidence that in every case there must be these smoke lobbies unless there was an alternative means of escape. He submitted that the evidence was not strong enough to warrant the Tribunal coming to such a decision which would have very far-reaching effects in the future.

After consulting in private for a short time the Chairman said the Tribunal had decided to allow the appeal. They had arrived at the decision simply in respect of this case, and it did not lay down any principle which would create a precedent.

The appellant was awarded 50 guineas costs.

Obituary.

MR. BARNES-WILLIAMS.—The death on August 8, at Margate, is announced of Mr. Thomas Barnes-Williams, of No. 98, Piccadilly, in his fifty-ninth year. Mr. Barnes-Williams was senior member of the firm of Messrs. Barnes-Williams, Ford, & Griffin, of No. 30, Coleman-street, E.C., and St. Thomas's-chambers, No. 24, Railway-approach, London Bridge, S.E., architects and surveyors. That firm was dissolved on August 1, 1903, as far as regards Mr. L. R. Ford upon his acceptance of the appointment of District Surveyor for West Wandsworth. On December 31 of that year Mr. Barnes-Williams and Mr. A. Griffin dissolved partnership by mutual consent; the latter carrying on the practice of the firm, the former retiring from general practice whilst rendering himself available for purposes of consultation. In January, 1898, Mr. Barnes-Williams retired from the post of Architect and Surveyor to the Coopers' Company; in January, 1901, he resigned his appointment as District Surveyor for St. Mary Magdalen, Bermondsey; St. John, Horsleydown; St. Olave, and St. Thomas, Southwark; and on January 1 of last year he retired as Surveyor to the Trustees of Morden College, Blackheath. He was elected in 1871 an Associate and in 1886 a Fellow of the Royal Institute of British Architects; in 1868 he became a member of the Architectural Association; and he was a Fellow of the Surveyors' Institution. On January 12, 1889, we illustrated Mr. Barnes-Williams's designs for Mr. E. Stanford's premises, Nos. 26-7, Cockspur-street, built upon the site of the old British Coffee-house, and on March 26, 1892, his designs for Messrs. F. C. Mathieson & Sons' premises, "Token House," in Copthall-avenue, E.C. Of the more important architectural works erected after his firm's plans and designs we may mention, in nearly their chronological order, the stabling and other premises for the Acme Wood Block Company in Gainsborough-road, Hackney Wick; a residence at Knockholt, Kent, for Dr. Stericker (1895); shops and premises at Nos. 241-7 (even), City-road with subsequent extensions, for Betts & Co., Ltd.; a warehouse and printing offices, Cross Keys-court, London-wall, for Mr. G. J. Mathieson; the parsonage-house and a cottage residence at Woldingham; Messrs. Boome & Sons' warehouses in Long-lane, Bermondsey; the billiard-room, Conholt Park, Wiltshire, for Mr. George Knowles, and some cottages for him at Conholt; extensive warehouses (1898) in Tooley-street, S.E., for W. France & Co., Ltd., costing about 12,500*l*.; the reinstatement after a fire, of the Salvation Army shelter in Bermondsey; No. 54, Stamford-street; rebuilding of Nos. 23-4, St. Martin-street, S.W., for Mr. T. Dent Gardner; warehouse premises in Pickleherring and Vine streets, Horsleydown, with a widening of part of Stoney-street; new buildings to accommodate thirty-three additional patients, St. John's Hospital, Lewisham, built by Mr. H. L. Holloway in 1899 on a contract for 5,370*l*.; alterations and improvements of No. 31, Old Jewry, E.C., for Messrs. Freshfields & Williams, at an outlay of some 7,500*l*.; hospital buildings at Morden Hall, Lewisham, for the Nursing Sisters of St. John the Divine; buildings in Farncombe-street, Bermondsey; and in 1902, the alterations, etc., for the conversion of the old Claremont Chapel, Pentonville-road, into a centre of London Congregationalism, the cost amounting to 8,000*l*. They also won the first premium in a limited competition for the rebuilding at a cost of about 10,000*l*., of the Whitefield Tabernacle, Tottenham Court-road, on behalf of the Special Committee of the London Congregational Union.

General Building News.

BOSTON PARISH CHURCH ROOF.—The state of the chancel roof of the Boston Parish Church has been the subject of a report, prepared for the Boston Town Council by Mr. S. Weatherley, architect, and Mr. G. E. Clarke, the Borough Engineer, who state that the roof of the chancel is in a very serious condition. Mr. Weatherley states that the time has passed for repairs, and that the roof must be reconstructed. Mr. Clarke estimates that the cost of the necessary work will be about 1,000*l*.

CHURCH, ROSS.—The opening service was recently held in the new church at Hom Green, Ross, built at a cost of over 3,000*l*. The building, which is in the Gothic style of architecture, is built of sandstone with facings and buttresses of Bath stone, and is covered with ancient stone tiles removed from Queen's College. The church is entered by way of a carfax porch, from which the whole of the interior can be seen through two apertures. A feature in connexion with the building is that a series of Bath stone pillars and arches run down the centre and form the support for the barrel-shaped roof. An oak screen, made by Mr. Clarke, of Hereford, divides the church in equal halves, one portion being the chancel, and the other being used for the congregation. The flooring of the major part of the chancel is raised two steps above the other portion of the church, and is laid with black and white marble slabs in various designs. The altar frontals were made by Messrs. Watts, of London. The interior of the church is plastered, and the belfry, made for one bell, is over the porch. The seating accommodation is for sixty, but over 100 worshippers can be comfortably seated. Wooden blocks form the floor where the congregation sit, and the remainder of the flooring is composed of concrete. Heating will be by means of hot air. Mr. G. F. Bodley, R.A., of London, was the architect, and the builders were Messrs. Rattee & Kett, of Cambridge.

ALL SAINTS', WORCESTER.—A good deal of anxiety is felt for the safety of the tower of this church. For some time (says the *Birmingham Daily Post*) the bells have not been rung owing to the damage caused by the vibration, and some days ago, without the slightest warning, a piece of stone, weighing upwards of a hundredweight and forming part of the base of a small window sill, fell from the tower and crashed through the roof of the adjoining schoolroom, which at the time, fortunately, was unoccupied. The diocesan architect (Mr. A. Hill Parker) was at once called in, and it is expected that a considerable outlay will have to be undertaken.

WESLEYAN CHURCH ENLARGEMENT, WARE.—The Wesleyan church in the New-road, Ware, is undergoing renovation and enlargement. The schoolroom has hitherto occupied a position above the entrance to the building, and the vestries communicated with the passage leading into the church. The front portion of the building, however, has now been taken down, and the gallery will be removed, and the entrance set back 8 ft.; but an enlargement of the church will be effected, as a new building, comprising schoolroom, vestries church kitchen, and sanitary offices, is in course of erection at the rear of the church. The architect is Mr. Lewis Moore, of Hertford; and Messrs. Dewbury & Sons are the builders.

PRIMITIVE METHODIST CHURCH, WEST SLEEKBURN.—On the 11th inst. the memorial stone of the new Primitive Methodist Church at West Sleekburn was laid. The church has been designed by Messrs. Phillipson & Davison, architects, of Newcastle, and the cost, including the erection of a pipe-organ, is estimated at about 1,050*l*. The building will be faced with pressed bricks supplied by the Bedlington Coal Company.

CHAPEL AND SCHOOL, YELVERTON.—The foundation-stones of a Bible Christian chapel were laid at Yelverton on the 8th inst. Mr. W. Beddoe Rees, of Cardiff, is the architect. The new edifice, including the land, will cost about 4,500*l*. It will be in the Gothic style, and built of Pennant stone, with Bath stone dressings, and roofed with red Broasley tiles. Seating accommodation will be provided for nearly 500 persons. In addition, there will be a school-room, classrooms, deacons' room, etc.

SCHOOL ADDITIONS, HERTFORD.—The new buildings at the girls' school of Christ's Hospital were opened a short time ago by H.R.H. the Prince of Wales. The buildings were erected by Messrs. Ekins & Co., of Hertford, the premises being designed by Mr. Alex. R. Stenning. The principal building is the chapel, planned to seat about 350 persons, and finished externally with red kiln bricks. The interior is lined with stone, and this, together with the whole of the stone used in the building, has been obtained from the West Hoathly Quarries, Sussex. Externally, the roof is tiled, and surmounted by an oak fleche carrying

the bell, the upper part being covered with copper. The interior of the roof is of oak enriched with Gothic pierced work and carving, with moulded hammerbeam principals. The aisles are paved with black and white marble, the portion occupied by the pews being floored with oak blocks. The building is fitted up with electric light and heated by low-pressure hot-water system and open gratings. The sick-house is a three-story building containing accommodation for twenty-four children, with nurses' sitting-room and bedrooms, doctor's surgery, pantries, offices, etc., with the bath-rooms and lavatories in an annex shut off from the remainder of the building. The larger wards are heated by radiators in addition to the open fireplaces, the building is fitted with electric light, and there is a lift from the basement to the upper floors. The building is also faced with red kiln bricks, with Portland stone dressings, and tiled roof. The isolation block, which adjoins the sick-house, is similar in design and accommodation. The bath and gymnasium buildings contain a swimming-pond 54 ft. by 20 ft., varying in depth from 3 ft. to 5 ft. 6 in., lined with white glazed tiles. Twenty children's dressing-boxes and four boxes for mistresses are provided, with towel store and other offices. The interior walls are lined with buff bricks, with a dado of white opalite tiling. The interior walls of the gymnasium—which is 72 ft. by 32 ft. 6 in.—are lined with glazed bricks, the roof and floor being of pitch pine. The building is heated by hot-water pipes running round the walls, and there are two cloak-rooms, fitted with lockers, etc. These buildings are faced with red kiln bricks, with Portland stone dressings, and are roofed with green Westmorland slates.

SCHOOL ENLARGEMENT, CALLANDER, N.B.—At a recent meeting of the School Board of Callander the plans for additions to the M'Laren High School, prepared by Messrs. Stewart & Paterson, architects, Glasgow, sanctioned by the Education Department, were finally agreed upon, and arrangements made for beginning the work. It was resolved to borrow the sum of 1,200*l.* for the purposes of the contract.

CONGREGATIONAL EXTENSION SCHEME, RYTON.—A scheme which involves the rebuilding of the Congregational Sunday-school and the renovation of the church at Barmoor, Ryton, is now being carried out. The Sunday-school, which is to be also used as a hall, will provide accommodation for 400, whilst a small intermediate hall will seat about eighty, and a ladies' parlour forty. There are to be eight classrooms. The scheme will involve an expenditure of about 1,250*l.* Mr. John Arkless, of Ryton, is the contractor, the architect being Mr. J. W. Taylor, of Newcastle.

DISINFECTING STATION, KENSINGTON.—The Mayor of Kensington recently attended the Kensington depôt at Wood-lane and inaugurated the new disinfecting station which has been erected there at a cost of nearly 7,000*l.* The exterior of the building is constructed to a height of 4 ft. with blue Staffordshire bricks and the upper part with selected salt-glazed bricks with glazed terra-cotta dressings. The interior is built to a height of 4 ft. with glazed bricks, the walls above being lined with glass tiles. The whole of the structure is impervious to water, so that it may be washed down both inside and outside. The drawings and specifications were prepared by the late Borough Engineer (Mr. William Weaver). The disinfector is of the "Alliott and Paton" pattern.

A NEW CITY WORKHOUSE.—The City of London Union Guardians have adopted a report made by a special committee recommending the erection of a new workhouse and infirmary, to be administered from one block, upon the freehold site of the existing Homerton workhouse, and the disposal of the infirmary buildings, with their site at Bow, valued as a going concern at about 40,000*l.* The scheme will, it is calculated, effect an annual saving of 3,000*l.* in respect of salaries and rations, of 400*l.* in rates, and of 2,000*l.* in water, coal, electricity, and gas. The approximate cost of the new buildings, for 700 beds, would be 140,000*l.* Whilst the number of paupers in the City has decreased during some years past, it is found that, in addition to the 75,000*l.* which have been lately expended upon the buildings at Homerton and Bow, their continuance would involve a heavy outlay for necessary improvements and repairs.

PROPOSED ADDITIONS TO THE SHIREHALL, BURY.—At Bury St. Edmunds, on the 1st inst., Mr. M. K. North, Inspector of the Local Government Board, held an inquiry as to the proposal of the West Suffolk County Council to borrow 12,500*l.* for alterations and additions to the Shirehall. Mr. A. Townshend Cobbold, Clerk to the West Suffolk County Council, showed that the Shirehall accommodation had been insufficient to meet requirements, both as regards the Court-room and the office accommodation. He reviewed what steps had been taken, resulting in designs for more commodious buildings. The lowest tender was 10,340*l.*, and there were other expenses, making in all a total of 12,586*l.* Mr. A. Ainsworth Hunt (West Suffolk County Surveyor) supplied detailed information as to the buildings.

INFECTIOUS DISEASES HOSPITAL, BELFAST.—The Lord-Lieutenant and the Countess of Aberdeen recently opened the new Infectious Diseases Hospital which has been erected by the Council of the County Borough at Purdysburn. The scheme of the block plan is arranged as follows: The main entrance from the county road is opposite the old entrance to Purdysburn demesne, and is guarded by a lodge and shelter for admittance of authorised persons and patients only; from this a private road within the ground communicates with all the buildings. Directly facing the entrance to the west is the administrative block. To the south are the pavilions for diphtheria and enteric classes. Opposite these on the west are two similar pavilions for scarlet fever. On the extreme south is an observation pavilion. Behind the administrative block are arranged the disinfecting house, laundry, engine and boiler houses, stables, and mortuary. The smallpox hospital, which is at present of a temporary character, occupies an isolated position on the west side of the other buildings. The administrative buildings consist of (1) the offices, with residences for the matron, for the assistant medical officers, for servants; (2) the nurses' home, containing rooms for fifty persons; (3) the female servants' rooms; (4) dining-rooms for nurses and servants; (5) the hospital kitchen, matron's storerooms, dispensing staff consultation room, and medical superintendent's room. In the basement are various storerooms, coal cellars, etc. From the kitchen will proceed glass-covered ways to each main pavilion, with subway beneath for steam, hot and cold water, and gas pipes, electric mains, etc. The hospital pavilions are set axially north and south, with ample windows arranged on both sides, and having sanitary annexes placed outside at each end. The patients are received in the hall at the middle of the block, with observation rooms and bath rooms attached at either side. The nurses' kitchen is placed between the wards with ten beds each, which are designed for males on one side and females on the other. In addition there are two single-bed wards for special cases adjacent to a room for a nurse, who is thus able to see all the patients under her charge. Beneath each of the pavilions is a cemented open basement about 6 ft. high. The ward floors are of polished teak, tongued and grooved, laid on the concrete. The walls are lined for a height of 8 ft. with glazed tiles of neutral tint; above this level they are cemented. The heating is effected by passing fresh air through radiators, which are fed with water from Boyle's calorifiers in every pavilion. The extraction is done by fires and aspirating flues placed in the centre of the ward, and lined with glazed tiles to the ceiling. In addition an electric fan, to which ducts are led, is employed in close weather as an auxiliary. The lighting is entirely by electricity. The style of architecture adopted is a plain treatment of early Georgian, but the windows have large panes of plate glass for cleaning purposes. All the walling is of best Belfast red brick, with trimmings of rubbed sandstone from Hunter's Hill, Glasgow. At the main entrance of the administrative block is a carving of the Belfast city arms, and the curved gable above contains an electric clock by Messrs. Sharman D. Neill, Ltd. All the roofs are covered with Staffordshire red tiles and ridges. In addition to the main pavilion there is an isolation pavilion for doubtful or complicated cases. The hospital kitchen, lighted from the roof, and lined with white glazed brick, is furnished with cooking apparatus supplied by Messrs. Riddels, Ltd., Belfast. The laundry has two distinct installations of washing and drying machines for patients and staff respectively, supplied by Messrs. Tullis & Co., Glasgow. The general contractors for the works are Messrs. Robert Corry, Ltd. Messrs. Diespeker, London, have executed the terrazzo; and Messrs. J. P. Corry & Co., Ltd., had the contract for the wall tiling. The grates and chimney-pieces and ward kitchen range were entrusted to Messrs. Richard Patterson & Co. Messrs. Riddels, Ltd., supplied the locks and fastenings; Messrs. John Dowling & Sons executed the plumbing work, and Messrs. William Coates & Sons, Ltd., carried out the electric lighting, etc., Davidson's Sirocco fans being used; and Messrs. Workman, Yeames & Co. supplying the dynamo engines. The boilers have been furnished by Messrs. J. Marshall & Co., Motherwell, and the large storage water tank was made by Messrs. Victor Taylor & Co., Belfast. Messrs. Charles Ritchie & Co., Edinburgh, have executed the hot water heating of the hospital buildings. Mr. J. E. Winter carried out the carving. The contractors for the furniture were Messrs. Robert Watson & Co., Ltd.; Messrs. Bell & Mayrs, and Messrs. Gillespie & Woodside. The architects of the work were Messrs. Young & Mackenzie, and Mr. Acheson Ferguson acted as quantity surveyor, Mr. Quinton Dunlop as consulting mechanical engineer, and Mr. John Woodside as consulting electrical engineer. The water supply to the hospital is from the Mourne section of the Belfast City and District Water Commissioners' undertaking, and was provided under the personal supervision of the Commissioners' engineer, Mr. Fred W. M'Cullough, M.Inst.C.E. The sewage of the establishment, acting on the advice of the City Surveyor, Mr. H. A. Cutler, M.Inst.C.E., it was decided to pump into the city system of sewers at Balmoral-avenue. The tender of Messrs. Mather & Platt, Ltd., of Salford Ironworks, Manchester, for the necessary pumping engines was accepted. In order to prevent the possibility of any risk of infection being conveyed by the sewage, a system of sterilisation has been installed, the contractors being Messrs. Goddard, Massey, & Warner, Ltd., of Nottingham.

PALACE THEATRE, HALIFAX.—Alterations and improvements are now being made to this theatre. Messrs. R. Horsfall & Son are the architects, and the various contracts have been placed with the following firms:—Joiners, Messrs. J. Wadsworth & Sons; ironfounders, Messrs. A. Pulman & Co.; painters and decorators, Messrs. J. Binns & Sons; upholstery, Mr. Greenwood Howarth; and carpets, Messrs. Baxter & Granger.

CO-OPERATIVE PREMISES, BRADFORD.—The City of Bradford Co-operative Society have opened a new suite of premises in Central-avenue, Little Horton-lane. Mr. W. Rycroft was the architect of the work.

INSTITUTE PREMISES, BEDFORD.—The building, which has been built by Mr. W. H. Allen, J.P., Chairman of W. H. Allen, Son & Co., Ltd., for the use of the workmen employed at the Queen's Engineering Works, was recently opened. Mr. George Allen prepared the plans for the work.

BURGH QUAY MEMORIAL, DUBLIN.—On the 3rd inst. the monument to perpetuate the memory of the Burgh quay disaster was unveiled by the Lord Mayor. A design submitted by Mr. William Patrick O'Neill, architect, of Dublin, was selected in competition. Messrs. C. W. Harrison, of Dublin, executed the work.

Stained Glass & Decoration.

CHANCEL SCREEN, RIDDINGS CHURCH, NOTTS.—A new chancel screen has been placed in this church. It is of wrought iron. The screen was manufactured by Messrs. Taylor, Whiting, & Taylor, Oakes-yard, Derby, from a design by Messrs. P. H. Currey and C. C. Thompson, architects, Derby.

Sanitary and Engineering News.

DRAINAGE IN FULHAM.—The Medical Officer of Health for Fulham, in his annual report which has just been issued, says:—"Fifteen systems of combined drainage, for portions of which the Council was liable, owing to certain of the pipes which received the drainage of more than one building, forming 'sewers' within the meaning of the Metropolis Local Management Act, were reconstructed during the year at a cost to the Council of 135*l.* 9s. 6d., the work being carried out by a contractor under a schedule of prices. The sum of 142*l.* 7s. 10d. was also paid to owners in respect of work executed by them in compliance with notices served by the Council at twenty-four houses in connexion with house drains, which were 'sewers' as defined by the Metropolis Management Act. Ventilation shafts continue to be erected by the Council in suitable positions whenever the necessary consent of the owners of the houses against which they can be placed is obtained. Many complaints having been received respecting offensive smells from the surface ventilators of the London County Council's main sewer in Fulham Palace-road and Dawes-road, the London County Council has, at my suggestion, installed some of Reeves's sewer ventilators in that sewer, which so far appear to have answered satisfactorily. The heavy rains at the beginning of June resulted in an extensive flooding of the basements in all parts of the borough. It has been hoped that the increase of pumping power at the London County Council's pumping station in Lot's-road would prevent this evil, from which Fulham has suffered so much, but on this occasion it utterly failed to cope with the storm water, as many basements were flooded which had never previously suffered. The matter was considered by the Public Health Committee, who recommended that strong representation should be made to the London County Council, pointing out the inconvenience and damage that is caused by these floodings, and the danger to health caused by the deposit of sewage, and calling upon them to take such steps as will rectify the evil."

LINCOLN WATER SUPPLY.—Mr. N. McK. Barron, the Lincoln waterworks engineer, has submitted a report to the City Council dealing with the present mode of water distribution, and the condition of the reservoirs, and making certain recommendations. Mr. Barron is of opinion that the right situation for a new reservoir is on the high ground near Cliff Hill reservoir. This he considers preferable to the Westgate side because of the possibility of utilising the existing mains. It is also pointed out that it would be impracticable to provide a good supply for the County Asylum from Westgate. The report, which will be considered at the October meeting of the Council, estimates the total cost of the works recommended at 55,100*l.*

WATERWORKS, NORTH SUNDERLAND.—The works for the new water supply to North Sunder-

and have recently been completed. Messrs. Anson & Shenton, civil engineers, of Westminster, prepared the scheme and estimate for the trustees of Lord Crewe's Charity. The present scheme brings water from the moors by gravitation in 4-in. iron pipes from the collecting reservoir at Brockdam on the moors through the villages of North Sunderland and Chathill to the main reservoir at Seahouses. The capacity of the Brockdam reservoir is 30,000 gallons and that of the Seahouses reservoir 60,000 gallons. The pipes deliver about 80 gallons a minute into the Seahouses reservoir with a fall of 275 ft. The water from the various springs has been caught in collecting tanks on the site of the springs, and is led thence to the reservoir at Brockdam. The cost of the works, including pipe trench, reservoirs, collecting-tanks, fittings, and purchase of existing works has been 4,791*l.* The pipes were supplied by Messrs. Cochrane & Co., and the work on the pipe track and reservoirs was carried out by Messrs. Elliott Brothers, of Chathill. The construction was carried out under the supervision of Messrs. Anson & Shenton.

HOUSE DRAINAGE IN MARYLEBONE.—The Medical Officer of Health of Marylebone, in his annual report which has just been issued, says :—"Plans properly indexed of the majority of houses exist and are in the custody of the Public Health Department ; some of the plans date back from the year 1856. They can be consulted by any person interested. The new plans deposited during the year amounted to 419, and dealt with 433 premises. The length of drainage supervised and tested by the inspectors during the year amounted to 50,440 ft. If laid out in one continuous line the pipes would reach from Westminster Bridge almost to Croydon, for the length is over 9 miles. Since so much time is taken up in the supervision of drainage, and such supervision necessarily requires considerable technical knowledge, the Public Health Committee adopted the suggestion that two of the staff should practically confine their attention to this matter as an experiment until the duties of the whole staff were revised and settled accordingly. Messrs. Gorniot & Perry have undertaken this important duty, the one being allotted to the district south of the Marylebone-road, the other the district north of the Marylebone-road. So far they have carried the work out to my entire satisfaction. The only defect that the author can see in the supervision of new drainage works is the sub-division between the two Committees, the Works Committee being responsible for the portion of drain between the house and sewer and for 'combined' drains, and the Public Health Department for the drain within the house and fittings generally. Hence a builder or owner has to deal with two offices and much time may be, and in fact is, occasionally wasted by this arrangement."

Foreign.

FRANCE.—M. Detaille has just completed an allegorical ceiling painting, the last remaining portion of his commission from the Paris Municipal Council for the decoration of the Hôtel de Ville. This decoration includes two large mural compositions ; the enrolment of volunteers at Paris in 1792 and the reception of the Imperial troops on their return from the campaign of 1807. The ceiling, which completes the scheme, represents a figure of Victory mounted on a winged horse, waving a tricolour flag, and encouraging the advance of a troop of horsemen in the uniform of the cuirassiers of the First Republic. Above the mounted Victory hovers a flying figure of Liberty carrying crowns and palms. The design of the painting is full of energy, and the tone of colouring bright and harmonious.——The works have been commenced for the enlargement of the Mairie of the second arrondissement of Paris. The cost is estimated at 300,000 francs.——A sixth lunatic asylum has been built in the Department of the Seine.——The Municipality of Suresnes have decided on the demolition of the ancient church of that Commune, which is in a ruinous condition. The church dated back originally to the XIIIth century, but was partially rebuilt in the XVth century.——A competition is to be opened for the erection of an Infirmary at Bar-le-Duc.——There is a scheme talked of for the formation of a tunnel under Mont Blanc. The cost of the operation is estimated at 50,000,000 francs. ——Important works of public improvement are contemplated at Cambrai, at an estimated cost of a million and a half francs. Besides new buildings and street improvements, it is proposed to fill up or to turn one arm of the river Escaut. ——The Municipality of Marignane (Bouches du Rhône) has voted the funds necessary for the construction of a canal to connect the lake of Berre with that of Bolmon.——M. Coureau, architect, of Agen, has been commissioned, as the result of a competition, to carry out a new post-office building in the Boulevard Carnot in that town.——The death is announced, at Dieppe, of M. Haquette, a pupil of Cabanel and of J. P. Laurens, who several times gained medals at the Salon. He painted principally sea-pieces and coast-scenes in Normandy.

GERMANY.—Though Herr v. Bülow can find water with a divining rod, he is reported to have said he could not detect water carried through pipes. Herr Franzius consequently made experiments in this direction and found that the rod twisted in his hands when he crossed over a conduit or walked up stream, but that it was unaffected when he walked down stream or when the mouth of the pipe was blocked up and the water ceased to flow.——Messrs. Brown, Boveri & Co., of Mannheim, are providing a steam turbine of 24,000 h.p. for the rollers and smelting furnace of Krupp's Works. On the London Underground railway the turbine installation amounts to 65,000 h.p., while in Paris the St. Denis generating station has ten turbines producing 90,000 h.p., and is consequently the biggest steam turbine installation existing.——About 2,000 persons are engaged on the technical dictionary which the Society of German Engineers is compiling in three languages, German, English, and French. At present the words number 3,000,000 and the alphabetical list is so far completed that the printing will be put in hand early next year. J. J. Weber, Leipzig, is the printer and publisher. ——On June 18 the foundation stone was laid in Helsingfors of the Finnish National Museum. In this building will be gathered together various scattered collections of furniture, costumes, and objects of historical, ethnographical, and archæological value.——The German Government has built for the harbour of Tsingtau one of the largest and most complete floating docks in existence. It has a capacity equivalent to 16,000 tons and measures 125 mètres by 39 mètres by 19 mètres high. Since its opening in October, 1905, the dock has been in constant use. The construction of such a work in East Asia is of great importance for the development of German interests in the Far East.

AUSTRIA.—On July 19 the Archduke Franz Ferdinand opened the railway between Assling and Trieste *via* Görz. The ground presented problems of the greatest difficulty which were overcome by an almost continuous series of tunnels, viaducts, and bridges. This line, besides increasing the commercial activity of Trieste, opens up a country of extraordinary beauty, which up till now has been neglected by tourists on account of the difficulty of access.——In November will be celebrated the centenary of the German Technical University in Prague.—— Roofing paper as a lining for slates has been pronounced superfluous in the report prepared at the instigation of the Austrian Minister of Public Works. The great disadvantage of this covering lies in the fact that it hides the joints of the boarding, so that the nails cannot avoid the joints ; also the workman relies more and more on the impervious nature of the paper to the detriment of his work. Repairs are made more difficult when paper is used, for defective slates cannot be traced, the damp only showing itself where the paper is by chance damaged. It is also injurious to the wood. Roofing paper is only to be recommended where a close atmosphere is required, free from soot and dust or when a building has to be rapidly roofed in during unseasonable weather. In this case, however, the paper should be fixed at a distance from the slate by a method altogether different from the one at present adopted.

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENT.—Mr. Walter Emden, J.P., of 2, Lancaster-place, Strand, architect, has retired, and has presented his business to his four principal assistants, namely, Mr. S. H. Egan, Mr. W. S. Emden, Mr. A. J. Croughton, and Mr. T. C. Ovenston, who will now carry on the firm at the same address under the name of Messrs. Emden, Egan & Co.

CALMON ASBESTOS SLATE.—This fire-resisting material has recently been introduced by the Calmon Asbestos and Rubber Works. It is made in sheets ranging in size from 13 in. square to 78¾ in. by 39¾ in., and in thickness from $\frac{7}{64}$ in. to ¼ in. It has a smooth egg-shell finish on one side, and has been used as a roof-covering instead of ordinary slates or tiles, as a lining for walls instead of plaster or match-boarding, and as an insulator for electric cables, etc. The material is non-flammable, and one of the two qualities made is guaranteed to be waterproof.

THE HEAVING OF PILES BY FROST.—A curious instance of the heaving of piles in frozen ground is recorded by the *Engineering News* of New York. This movement of the piles was experienced at a trestle viaduct about 2,200 ft. long, with a maximum height of 80 ft., built across a peat swamp to the west of Winnipeg, on the Grand Trunk Pacific Railway. The structure is a framed trestle, with seven piles under each bent, and the piles were driven to an average depth of 30 ft., the first 10 ft. being soft peat and the underlying material a mixture of sand and clay. The penetration during the last blows of the pile-driver was only 1 in. or 2 in. ; a 2,200 lb. hammer was used, having a maximum drop of 40 ft. The three centre piles were spaced 2 ft. 6 in., centre to centre, and capped with a 12 in. by 12 in. sill, 10 ft. long ; beyond these on each side were two piles spaced 5 ft. and 11 ft. apart, supporting the inner and outer batter posts on a long sill. When the ground became frozen, the outside piles in some of the groups were raised about 3 in. and 4 in., but those in the centre showed no disturbance whatever. The heaving occurred only at bents where the superstructure had not been erected, but was framed and lying on the bents ready for raising, and the sills were simply bolted to the piles. Instead of cutting the piles off, as is usually done, they were driven home with a few light blows of the hammer, but even heavy blows failed to increase the penetration, thus showing that the piles were simply restored to their original position.

TABLET, GROESWEN CHAPEL, NEAR CAERPHILLY.—Sir Alfred Thomas, M.P., unveiled on the 3rd inst. a bronze tablet at Groeswen Chapel, near Caerphilly, to the memory of Mr. William Edwards, who during the forty years he officiated as pastor of the Groeswen Independent Church built many bridges in Wales, including Pontypridd Bridge. The tablet is the work of Mr. Goscombe John, A.R.A.

BUILDING TRADE EXHIBITION, NEWCASTLE.—The Newcastle Exhibitions, Ltd., are organising an exhibition specially for builders, decorators, and sanitary engineers. A committee has been formed of architects, surveyors, and contractors, who are giving the venture all the assistance possible. The exhibition will open on Saturday, September 15. Mr. W. A. Cowie is the manager.

POST OFFICE BUILDINGS.—In his annual report, just presented to Parliament, the Postmaster-General (the Right Hon. Sydney Buxton, M.P.) remarks that in October last the foundation stone of the new General Post Office (King Edward's Building) was laid by His Majesty and that the plans for the building have now been settled and have received the sanction of the Lords of the Treasury. Sites have been acquired for considerable extensions of the Western Central District Office, London, of the Paddington District Sorting Office, and of the Belfast Head Post Office. The erection of new buildings for the Northern District of London and for Aberdeen and the enlargement of the Eastern District Office of London have been nearly completed. Plans for an extension of the General Post Office at Edinburgh, for a new letter sorting office at Manchester, for an enlargement of the Head Post Office at Bristol, and for a new Head Post Office at Sheffield have been under consideration. The second Central Telephone Exchange in the General Post Office South, the new Parcel Office for the South Eastern District of London, and the Postal Stores building at Islington have been completed and occupied. Telephone exchanges at Epsom and Ealing have been completed and occupied, the exchanges for the Western District of London and for Richmond have been enlarged, and considerable progress has been made with the provision of other exchanges in London and the provinces. During the year 207 Crown Post Office buildings have been provided, of which 99 are new offices specially erected for Post Office purposes, and 54 are offices of which the tenancy has been taken over by the Department after the buildings had been altered and enlarged. Forty-two Crown Post Offices have been enlarged or improved, and 98 are in course of enlargement or improvement. The expenditure out of the Post Office votes for the purchase of sites and buildings during the year amounted to 185,015*l.* as against 123,728*l.* in 1904-5. The expenditure in London was 56,524*l.* During the year the expenditure by the Commissioner of Works and Public Buildings on new Post Office buildings and on the enlargement and maintenance of existing buildings amounted to 449,181*l.* in Great Britain and 23,554*l.* in Ireland. The corresponding figures for the previous year were 480,183*l.* and 37,652*l.*

ARCHÆOLOGICAL DISCOVERY, WORCESTER.—The preliminary work in connexion with the intended demolition of the shop upon the Cross, where Messrs. Masters' tailoring establishment stood, in order that new premises may be erected on the site, was the cause of an interesting discovery. From what was the front shop a trap door leads into a cellar, from which access is given into a kind of crypt, which is, roughly, about 20 ft. by 15 ft., and between 10 ft. and 12 ft high at its highest point. The only light—and this is very faint—is obtained by means of a cellar flap, and has to percolate through the front cellar before it reaches the crypt. The floor of the crypt is 8 ft. below the level of the street, a fact which, taken in conjunction with the fact that a large doorway gives entrance to the chamber, suggests that the level of the street has risen. The crypt has a groined, stone roof, the ribs springing from the four corners of the chamber, and two central corbels. The central rib or arch spans the crypt singly, but those upon either side cross each other.

BIRMINGHAM CORPORATION CONTRACTS.—At a meeting of the Birmingham Trades Council last Saturday, under the chairmanship of Mr. W. J. Morgan, a discussion arose on a question moved by Mr. Targett expressing the regret of the Council that in the large number of contracts recently let by various committees of the Corporation

no provision was inserted to prevent the ever-increasing importation of quarry-worked stone. The resolution urged upon members of the Corporation the necessity, whilst the prevailing lack of employment continued, of restricting as much as possible the importation of such stone in future contracts, "believing that thereby great assistance will be rendered to the solution of the unemployed problem," and further expressed the opinion that the continual sub-letting and re-sub-letting of this branch of the building trade was detrimental to both ratepayers and workmen. Mr. Targett said something was bound to go when there were two or three to get a profit out of the same contract. The ratepayers suffered because they did not get the quality of work they should have for their money, and the workmen suffered because they had to work under more harassing conditions. What they wanted to know was why the Corporation could not let work to a good substantial builder, who could carry out the whole of it. Mr. Badham seconded the resolution. The Secretary (Mr. J. E. Berry) admitted the evil of sub-letting, but recognised that it was not always possible to avoid it. He sympathised with the desire of the stonemasons to keep work in the city as much as possible, but he thought they would find their remedy was to secure adherence all round to the fair-wage clause. The men would not then suffer. Mr. Eades supported the resolution, and was followed by Mr. Haines. Mr. Fred Hughes pointed out that the working of stone would inevitably drift into the quarry districts. Councillor Keegan said the resolution was bad in principle and would be unworkable in practice. It was frequently stipulated that stone must be worked in the quarries, not for reasons of cheapness, but because the men who got the stone in the first place knew how it was bedded, and were therefore able to dress it better than anyone else. In his reply to the discussion Mr. Targett contended that the Corporation could help them if they liked, and that they had been in a position to do so for months past. The fair wage clause was a farce. On being put to the meeting the resolution was lost, twelve voting for and thirty-five against.

A NEW BOILER FEED PUMP.—In the present-day the use of direct-acting steam pumps has become fairly general for boiler-feeding purposes, and the various types of such apparatus already on the market are doubtless well known to our readers. A new pattern vertical pump of the same class, recently introduced by Messrs. Mather & Platt, of Salford, presents several special features, which should be of interest to steam users. The steam valves are simple, having only two moving parts, and the valve lever, fitted with a roller bearing to reduce friction, is arranged so that the pistons and rods turn round while working so as to insure uniform wear. The water end is a tubular casting designed to withstand high pressures, and is fitted with patent group valves of small lift designed so that they can be readily withdrawn whenever required. The water cylinders are lined with gunmetal, and the water pistons are fitted with bronze or ebonite rings according to the nature of the service. These pumps are supplied in four stock sizes, with capacities ranging from 2,700 gal. to 6,600 gal. per hour, and as all parts are made to standard gauges and templets, repairs and renewals can be effected with a minimum amount of trouble.

Legal.

ACTION BY ARCHITECTS FOR FEES.

THE case of Elms and Jupp *v.* Foyat came before the Court of Appeal, composed of Lords Justices Moulton and Farwell, on the 10th inst., on the appeal of the defendant from an order of Mr. Justice Bucknill in Chambers.

Mr. Schiller appeared for the appellant, and Mr. Scott for the respondents.

Mr. Schiller, in opening the case, said the learned judge had refused to give the defendant unconditional leave to defend the action and that was the order appealed from. The action was brought by the plaintiffs, a firm of architects, for 77*l.* 19*s.* 4*d.*, their fees for the preparation of plans and specifications. What the learned judge had said was that the defendant should have leave to defend on paying 11*l.* odd to the plaintiffs' solicitor and on bringing the remainder of the plaintiffs' claim into court. His (counsel's) first point was that plaintiffs could not apply for judgment under order 14 at all, as their claim was not for a liquidated amount. What the plaintiffs had done was to estimate the value of their services and that did not entitle them to specially endorse the writ.

Lord Justice Moulton: Under order 14 you can proceed for work and labour done. There is nothing in your affidavit which says it is not a proper amount. We must assume therefore that it is the proper amount.

Mr. Schiller said he thought he should be able to show that the defendant was not liable for any portion of the sum claimed. With regard to the item in the claim for 66*l.* 13*s.*, the first defence was that the work was done, not for the defendant, but for Willis's Restaurant Company, Ltd.

Lord Justice Moulton: In which company the defendant appears to hold the whole of the shares.

Mr. Schiller said that appeared to be so.

Lord Justice Moulton: Then there is another fact that the defendant, in giving the order for the work, was not careful to distinguish between himself and the company. At that I am not surprised.

Mr. Schiller said that the defendant managed the restaurant, and in the correspondence which ensued he wrote in the first person, but that was not inconsistent with his acting on behalf of the company. A man had a perfect right to write in the first person and say he was acting for a limited company. But apart from that there was another defence so far as the item of 66*l.* 13*s.* was concerned, viz., that it was for work done on speculation. What he meant by that was this. It was in contemplation that some alterations should be made in the restaurant, and Mr. Foyat approached the plaintiffs, who were the successors of a firm who had previously done work for Willis's Restaurant, and in whose employ Mr. Jupp was, he being the managing clerk. Plaintiffs knew that these alterations were in contemplation at the restaurant and discussed them with the defendant. The defendant said that the plans could be got out on the terms that the plaintiffs would be allowed their fees if the work was carried out. The work was never done. It was clear there was an issue as to whether the plaintiffs were entitled to anything at all. Mr. Jupp, in his affidavit, said that his firm undertook the work and looked to the defendant personally for their fees. Defendant agreed that the 11*l.* was due to the plaintiffs from somebody.

Lord Justice Moulton said that so far as the 11*l.* was concerned, the order appealed from would have to stand. He had looked through the correspondence on the matter and as far as he could see there was no ground for setting aside the order of the learned judge as to that.

Mr. Scott, for the plaintiffs, said that the real defence was that the work was done for the company and that the company would only pay for it if the alterations were carried out. That contention was not borne out in the correspondence.

Lord Justice Moulton: You say the defendant's affidavit is contradicted by his letters?

Mr. Scott said that was his contention.

Mr. Schiller said that the defendant personally did all the negotiations.

Lord Justice Moulton: You cannot look at his affidavit without seeing that he did the work on his own behalf consciously.

Mr. Schiller: He was the manager of the company and did, of course, everything for the company. He was the head and shoulders of the company.

Lord Justice Moulton: I think he was.

Mr. Schiller: Well, probably he was the company, but in law he cannot be the company. There must be two separate entities.

Lord Justice Farwell said he thought that the statements made by the defendant in his affidavit were untrue, or at least inconsistent with the letters he had written.

Lord Justice Moulton, in giving judgment, said in his opinion the affidavit which the defendant had put forward was one they could not accept in face of the letters. All they had to consider was the actual affidavit which had been filed. He was satisfied they could not accept that and therefore the appeal must be dismissed with costs.

Lord Justice Farwell concurred.

Mr. Schiller: I think the time has run out for bringing the money into court.

Lord Justice Moulton: We will give you another fortnight.

Mr. Scott: I suggest ten days, my lord.

Lord Justice Moulton: No, I think a fortnight. It is the Long Vacation and it will not hurt you.

POINT UNDER THE LONDON BUILDING ACT, 1894.

THE hearing of the case of Adams *v.* the Mayor, etc., of St. Marylebone concluded before a Divisional Court of King's Bench, composed of Justices Ridley and Darling, on the 9th inst., on the plaintiff's appeal from a decision of the learned County Court Judge of Marylebone, who upheld an award made under the London Building Act, 1894.

It appeared that the plaintiff was the occupier of a restaurant which adjoined premises which the defendants were in the course of erecting and which were to be used as workmen's dwellings. It was necessary for the defendants to raise the party-wall between the two properties, and in carrying out this work injury was caused to the plaintiff in her business, the damage alleged being the loss of lodgers caused through the chimney being affected so as to prevent a fire being lighted and also through her being unable to cook food owing to the defective state of the chimney. The matter went before two arbitrators under the provisions of the Act and they refused to consider those damages, their contention being that they had no power under the Act to deal with damages of a consequential nature. From this decision the plaintiff appealed to the learned County Court Judge, who upheld the views of the arbitrators and dismissed the appeal. Hence the present appeal of the plaintiff.

Mr. Poyser appeared for the appellant; and Mr. G. A. Scott for the respondents.

Mr. Poyser contended that sect. 91 (1) of the Act enabled the arbitrators to award compensation not only for structural damage but also for the consequential damage. The plaintiff had, he said, suffered considerable damage, and ought to be compensated.

Mr. Justice Ridley said that the Act did not lay down that the plaintiff could not get damages elsewhere.

Mr. Poyser submitted that the Act was intended to be a code under which all matters as to damage with regard to party-walls was to be settled.

Mr. Scott, on behalf of the respondents, contended that it was not intended that compensation of this character should be awarded under the section. The scheme of the Act was to refer to the tribunal of surveyors questions of work only, viz. the manner of carrying out the work.

At the conclusion of the arguments of counsel, Mr. Justice Ridley, in giving judgment, said that the case raised a point of some importance, viz. whether or not the arbitrators were entitled to take into consideration consequential or trade damage in awarding compensation under the Act. For himself he was of opinion they had no such jurisdiction. All the cases cited during the arguments seemed to be pregnant with the idea that structural damage was only to be considered by them. The whole scope of the Act was to refer to the arbitrators the question of the way in which the work had been done. It was recognised, however, that there might be some cases where compensation for damage of the character in question ought to be given to an adjoining owner and provision was made by the Act for such compensation to be paid by the building-owner. He thought that the object of the Act was to remove difficulties caused by the joint ownership of party-walls, but he did not think that it necessarily followed that the Legislature intended in the London Building Act to provide a remedy for every species of damage which might arise from dealing with party-walls. It was intended to give a specified remedy for things done in the public interest, as the operations conducted under the Act were for the public interest. In this case if the arbitrators had done what the plaintiff submitted they should have done, they would, in his opinion, have gone beyond their jurisdiction. He thought, therefore, that the appeal should be dismissed.

Mr. Justice Darling concurred, and the appeal was accordingly dismissed with costs.

Their lordships granted the plaintiff leave to appeal.

STRAND BUILDING DISPUTE.

THE case of Draper *v.* Lorden came before Mr. Justice Buckley in the Chancery Division on the 10th inst.

Mr. Buckmaster, K.C., said the plaintiff was the lessee of certain premises at the east corner of Bedford-street and the Strand, and his lease included No. 422, Strand, and No. 51, Bedford-street. The defendant had acquired the premises, Nos. 421 to 419, Strand, on the eastern side of the plaintiff's premises. On May 3 last a notice was served on the plaintiff signed by one Hunt, purporting to be a party structure notice under the London Building Act. It appeared that after the notice was served, the defendant acquired from Hunt his interest in the premises and nothing was done under that notice. On July 1 without any notice at all, workmen began to demolish the premises No. 421, Strand, and on July 14 another notice purporting to be a party structure notice under the London Buildings Act and signed by the defendant was served on the plaintiff.

Mr. Cozens-Hardy, on behalf of the defendant, said that the notice was addressed to the freeholder.

Mr. Buckmaster, continuing, said it could not be alleged that the work had been done pursuant to the terms of the notice, because a month must elapse before they could act on the notice served. The plaintiff complained that what was done was not justified upon the ground that it was not done pursuant to the statutory rights following the notice. The defendant proposed to remove the premises adjoining the plaintiff's. On July 21 a dangerous structure notice was served on the plaintiff and the defendant with regard to the party wall that formerly divided plaintiff's house from the defendant's. There was no dispute whatever that the defendant intended to demolish No. 421, Strand, and there was nothing in controversy on the present motion with regard to the plaintiff's right to support. But what was suggested was that what had been done at the present moment was not to withdraw support from the plaintiff's wall. It seemed impossible for the defendant to deny that what he admittedly proposed to do must of necessity withdraw the support with most dangerous consequences to the party wall. They had not shored the party wall for the reason that, having regard to the age of the premises, if they were to shore it they would shove the whole building into Bedford-street.

LEGAL.—*Continued on page 245.*

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, —; Contracts, iv. vi. viii. x.; Public Appointments, —; Auction Sales, xxvi.

Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bonâ-fide tender unless stated to the contrary.

Competition.

AUGUST 31.—**Barnsley.**—SCHOOL.—The Governors of the High School for Girls, Barnsley, invite applications from qualified practising architects desiring to compete for the designing and erection of a new high school for girls, to accommodate 400 pupils, on a site in Huddersfield-road, Barnsley. The Governors propose to select from the applicants a limited number of competitors, who will be asked to submit plans. In connexion with such competition three premiums of 100*l*., 50*l*., and 20*l*. will be offered. The plans will be adjudicated upon by a fully-qualified non-competing architect acting as assessor. Applications, which must be sent in before August 31, to Mr. Wm P. Donald, Clerk to the Governors, Education Office, Barnsley, should state (1) name of competitor; (2) business address; (3) particulars of secondary schools built from applicants' designs; (4) success of applicant in similar competitions; (5) the amount of commission (stated as a percentage on the amount for which the contracts are let) the competitor will be prepared to accept in the event of his plans being accepted; (6) the further sum required for taking off and supplying bills of quantities, also stated as a percentage; (7) any other information which the applicant may think it advisable to submit.

Contracts.

BUILDING.

AUGUST 18-28.—**Eastby.**—ENTRANCE LODGE.—Bradford Guardians invite tenders in one contract for the erection of an entrance lodge at the Sanatorium, Eastby, near Skipton. Applications not later than August 18, along with a deposit of 1*l*. 1s., to Mr. Fred Holland, Engineer and Architect to the Board, 11, Parkinson's-chambers, Hustlergate, Bradford. Particulars will be forwarded in due course. Drawings and specifications may be seen at the Architect's offices. Sealed tenders, on separate forms of tender supplied, to be endorsed "Eastby," to be sent to Mr. George M. Crowther, Clerk to the Guardians, 22, Manor-row, Bradford, not later than 10 a.m. on August 28.

AUGUST 20.—**Belfast.**—SCHOOL.—A new school and matron's residence in Lancaster-street, Belfast, for the Trustees of the Ladies' Industrial School. Bills of quantities may be obtained from Mr. A. Ferguson, Scottish Provident Buildings, on payment of a deposit of 2*l*. 2s. Plans and specification may be seen at office of Messrs. Blackwood & Jury, M.R.I.A., architects, 41, Donegall-place, Belfast. Sealed and endorsed tenders to be lodged on or before 5 o'clock on August 20.

AUGUST 20.—**Cork.**—ADDITIONS TO HOUSES.—For additions to houses in Evergreen-road, Cork, for Mr. P. Ahern, in accordance with plans and specifications prepared by Messrs. W. H. Hill & Son, architects, 28, South Mall, Cork, with whom tenders are to be lodged on or before August 20.

AUGUST 20.—**Hitchin.**—STABLES.—The erection of new stables at Victoria-road, Hitchin, for Mr. G. Maidment. Plans and specifications may be seen at office of Mr. J. Shilcock, architect, Hitchin, between the hours of 10 and 5 (except Saturday). Sealed and endorsed tenders to be sent to architect on or before August 20, at 12 o'clock.

AUGUST 20 — **Usworth.** — BUILDINGS.—New buildings at Washington Estate, Hillthorn Farm, Usworth Station. Plan and specifications may be seen at Mrs. R. Snowdon's, Washington. Tenders to be sent in by August 20 to Mr. C. A. Wykeham Martin, Thame Park Estate Office, Thame, Oxon.

AUGUST 21.—**Billericay.**—WORKHOUSE ADDITIONS.—Billericay Guardians invite tenders for additions and alterations to the Workhouse of this Union, also for the erection of new receiving ward. Builders desirous of tendering must send in their names and addresses to the architect, Mr. Walter J. Wood, 26, Alexander-street, Southend-on-Sea, and 1, Finsbury-circus, London, E.C. (with a deposit of 1*l*. 1s.), on or before August 21, when a copy of the bill of quantities and form of tender will be forwarded as soon as same are ready. In sending in their names to the architects, builders must also give two references as to recent work carried out. The plans and specifications can be seen at the Workhouse, Billericay, or the architect's office, at Southend-on-Sea, after the quantities have been sent out, between the hours of 10 a.m. and 5 p.m. Mr. C. Edgar Lewis, Clerk to Guardians, New-road, Brentwood.

AUGUST 21.—**Kirkheaton.**—DWELLING-HOUSE.—The erection of a dwelling-house in Newland-road, Kirkheaton. Plans may be seen and bills of quantities obtained, at office of Mr. J. Berry, architect and surveyor, 3, Market-place, Huddersfield. Tenders to be delivered to architect not later than August 21.

AUGUST 21. — **Taff's Well.** — SLAUGHTERHOUSE. — Caerphilly U.D.C. invite tenders for the erection of a public slaughterhouse and other contingent works at Taff's Well. Plans and specifications may be seen, and schedule of quantities and form of tender obtained, at the Council Offices, Caerphilly, upon deposit of 2*l*. 2s. Tenders to be endorsed "Slaughter-house," addressed to Chairman of Council, and delivered at Council Offices, Caerphilly, not later than August 21.

AUGUST 23. — **Bedale.** — SUNDAY SCHOOL. — Bedale Wesleyan Sunday School Trustees invite tenders for the building of the same. Plans and specifications to be seen at the house of Mr. F. Gatenby, Bedale. Sealed tenders to be sent to Mr. Gatenby not later than August 23.

AUGUST 23.—**Droylsden.**—PHOTOMETER-HOUSE, ETC.—Manchester Corporation Gas Committee invite tenders for the work required to be done in the erection of a photometer-house and extension of coal sheds at their Droylsden Station. Specification, bill of quantities, and tender form may be obtained on application to Mr. C. Nickson, Superintendent, Gas Offices, Town Hall, Manchester. The drawings may be seen, and other information may be obtained, on application to Mr. J. G. Newbigging, M.Inst.C.E., engineer, at his office, Rochdale-road Gasworks. Sealed tenders, enclosed in official envelope, and addressed to "The Chairman of the Gas Committee," Town Hall, Manchester, to be delivered not later than 10 a.m. on August 23.

AUGUST 23.—**Frosterley.**—INSTITUTE AND HALL.—For the erection (labour only, for all or each trade separately) of an institute and hall at Frosterley. Tenders to be sent not later than August 23. Plans and specifications may be seen at Mr. Matthew Lee's, Frosterley.

AUGUST 24. — **Belfast.**—PARK STRUCTURES.—Belfast Cemetery and Parks Committee invite tenders for the construction of the following works:—(*a*) Wooden bridge and (*b*) shelter in Victoria Park; (*c*) plant house and (*d*) forcing pits in Ormeau Park; (*e*) shelter in Botanic Gardens Park. Plans and specification may be seen, and forms of tender obtained, in the City Surveyor's Office. Separate sealed tenders, endorsed "Tender for" (as the case may be), to be lodged in office of Mr. Samuel Black, Town Clerk, not later than 10 a.m. on August 24.

AUGUST 24.—**Bristol.**—ALTERATIONS.—Bristol Guardians invite tenders for alterations at the old Register Office, at Eastville Workhouse, to adapt same as a relief depôt, in accordance with drawings and specification, which are deposited for inspection at office of Mr. J. J. Simpson, Clerk to the Guardians, St. Peter's Hospital, Bristol. Tenders for the execution of the work must be in the prescribed form, and must reach Clerk by 10 a.m. on August 24.

AUGUST 24.—**Glenkindie.**—SCHOOL HOUSE.—Towie Parish School Board invite estimates for the mason, carpenter, slater, plumber, plaster, and painter works of new school house to be erected at Glenkindie. The plan and specifications can be seen with Mr. Alex. Taylor, Castle Cottage, Kildrummy, with whom sealed offers, endorsed "Tender for School House," are to be lodged not later than August 24.

AUGUST 24.—**Throwleigh Ash.**—COTTAGE.—A moor cottage at Throwleigh Ash, Devon, for Miss Wintour, of High Hoyland, Barnsley. Plans and specifications at offices of Messrs. E. H. Harbottle & Son, architects, County Chambers, Exeter. Tenders to be delivered not later than August 24.

AUGUST 25.—**Abergavenny.**—ADDITIONS, ETC., TO PUBLIC-HOUSE.—Additions and extensive improvements to the Cardiff Arms, Abergavenny; also for the building of new stores, stabling, and other works for the Hereford and Tredegar Brewery Company, Ltd., Hereford. Plans and specifications may be seen, and further particulars and forms of tender obtained, at offices of Mr. B. J. Francis, architect, Abergavenny. Tenders, sealed and endorsed, to be sent to the architect not later than August 25.

AUGUST 25.—**Bangour, Edinburgh.**—SHED.—The Edinburgh District Lunacy Board hereby invite offers for the construction of the unloading shed at Bangour Village Station. The relative schedule may be obtained on application to the architect, Mr. Hippolyte J. Blanc, R.S.A., 25, Rutland-square, Edinburgh, where specification, general conditions of contract, etc., will be exhibited. The schedules shall be priced, extended, and lodged with Mr. James Kyd, Clerk and Treasurer, District Lunacy Board, Offices, Castle-terrace, Edinburgh, not later than August 25, at 10 a.m., along with the tender.

AUGUST 25.—**Bradford (Devonshire).** — ALTERATIONS, ETC.—Devon County Education Committee invite tenders for alterations, general repairs, painting, etc., at the Bradford Council School. The drawings and specification can be seen, and forms of tender obtained, at the school between the hours of 9.30 a.m. and 5 p.m. from August 14 to August 24 inclusive. Tenders must reach the architect, 1, Richmond-road, Exeter, not later than the first post on August 25.

AUGUST 25.—**Welshpool.**—REFRESHMENT AND WAITING ROOM.—The erection of additional refreshment room and waiting room for the Smithfield, Welshpool. Plans and specifications may be seen at the Town Clerk's Office. Sealed tenders, to be endorsed "Tender for Refreshment and Waiting Room," to be sent to Mr. C. Pryce Yearsley, Town Clerk, Town Clerk's Office, Welshpool, on or before August 25.

AUGUST 27. — **Ashton-on-Ribble.**—CHURCH.—For new church, Ashton-on-Ribble, Preston (for the whole or separate trades). Plans, etc., at the office of the architects. Bills of quantities may be obtained on application to Messrs. Wright & Son, surveyors, Lancaster. Tenders to be delivered (under cover) to the architects, Messrs. Austin & Paley, Lancaster, not later than noon, August 27.

AUGUST 27.—**Hawthorn.**—MISSION HALL.—For the erection of a mission hall at Hawthorn, Pontypridd, for the trustees of the English Baptist Church. Plans and specification may be seen at office of Mr. Arthur LL. Thomas, A.M.I.M.E., architect and engineer, Church-street Chambers, Pontypridd. Tenders to be sent to the Rev. E. Lewis, 89, Woodroad, Pontypridd, by **August 27.**

AUGUST 27.—**Hopkinstown, Pontypridd.**—WALL.—Pontypridd U.D.C. invite tenders for the reconstruction of about 150 lin. yds. of river retaining walls, together with fence walls, and contingent street works, situated at Hopkinstown, Pontypridd. Plans and specification may be seen, and bills of quantities and form of tender obtained, on application at the office of Mr. P. R. A. Willoughby, A.M.Inst.C.E., Engineer and Surveyor to the Council, upon receipt by Mr. J. Colenso Jones, Clerk to the Council, Municipal-buildings, Pontypridd, of a deposit of 1*l*. 1s. Tenders, on the prescribed form, sealed, and endorsed "Retaining Wall," must be received by the Clerk on or before August 27.

AUGUST 27.—**Knotty Ash.**—LAUNDRY BUILDINGS.—Liverpool Select Vestry invite tenders for the erection, at Highfield Infirmary, Knotty Ash, of laundry buildings, according to plans and specifications, to be seen at the office of the architects (Mr. Edmund Kirby & Mr. W. E. Willink), 5, Cook-street, Liverpool, between the hours of 10 o'clock a.m. and 5 o'clock p.m. Bills of quantities, conditions of contract, and forms of tender (upon which alone offers will be received) may be obtained at 5, Cook-street, on payment of a deposit of 2*l*. Sealed tenders must be delivered to Mr. H. J. Hagger, Vestry Clerk, Parish Offices, Brownlow-hill, not later than August 27.

AUGUST 27-SEPTEMBER 4.—**Lochmaben.**—HOSPITAL.—The Board of Directors invite tenders for the erection of Lochmaben (Dumfriesshire) Combination Hospital. Plans may be seen with, and schedules obtained from, Mr. F. Carruthers, architect, 35, Buccleuch-street, Dumfries, on August 27, on payment of 1*l*. 1s. Mr. Carruthers will meet intending offerers at the Town Hall, Lochmaben, on August 28, between the hours of 11 o'clock a.m. and 3 o'clock p.m.; and all tenders must be lodged with Mr. John Ford Cormack, solicitor, Lockerbie, Clerk to the Combination, on or before September 4.

AUGUST 28. — **Pontycymmer.** — SCHOOL-HALL.—The erection of a school-hall at Pontycymmer for the English Calvinistic Methodist Church. Plans and specifications may be seen with Mr. Owen Jones, 16, Meadow-street, Pontycymmer, or at office of Mr. Arthur Ll. Thomas, A.M.I.M.E., architect and engineer, Church-street Chambers, Pontypridd. Sealed and endorsed tenders to be sent to Mr. Owen Jones on or before August 28.

* AUGUST 28. — **Romford.** — HOSPITAL EXTENSION.—The Romford Joint Hospital Board invite tenders for erection and completion of one ward for fourteen beds, nurses' quarters, and convalescent block. The drawings, specification, and form of contract may be inspected at offices of architect, Mr. F. Whitmore, 73, Duke-street, Chelmsford, between 10 and 5. Builders desirous of tenders must send at once their names and addresses to the architect, enclosing deposit of 5*l*., when a copy of the bills of quantities and form of tender will be sent. Sealed tenders, endorsed "Tenders for Extension, Isolation Hospital," to be sent to Mr. W. Smith, Clerk, North-street, Romford, by August 28.

AUGUST 28. — **Woodford.**—ALTERATIONS.—Woodford U.D.C. invite tenders for the necessary alterations, repairs, etc., required to be done at "The Willows," Woodford Green, for the purpose of adapting the buildings for Council Offices, fire-station, etc. Specification may be seen, and form of tender obtained upon application to Mr. William Farrington, Surveyor to the Council, Council Offices, Woodford Green. Sealed tenders, endorsed "Tender for Alterations and Repairs at 'The Willows,'" to be sent in on the official forms not later than noon on August 28.

* AUGUST 31.—**Bristol.**—SUPERSTRUCTURE OF ELECTRICITY WORKS.—For the third instalment of the superstructure of the Avonbank Electricity Works, Feeder-road, comprising steelwork, masonry, concrete, etc. Drawings, specifications, and forms of tender may be seen and obtained at the office of Mr. H. Faraday Proctor, City Electrical Engineer, Temple Back, Bristol, on payment of 2*l*. 2s. Tenders must be delivered by noon on August 31, addressed to Electrical Engineer, sealed and endorsed "Tender for Superstructure."

AUGUST 31.—**New Malden.**—BOUNDARY WALL, ETC.—The Guardians of the Kingston Union invite tenders for building a boundary wall, erecting wood and iron fencing, and forming a path, at Norbiton Common Farm, New Malden, Surrey, in accordance with plans prepared by Mr. William H. Hope, C.E., architect and surveyor, Hampton Wick. The drawings may be seen, and a copy of the specification and form of tender obtained, on application to Mr. Jas. Edgell, solicitor, Clerk to the Guardians, Union Offices (opposite Norbiton Railway Station), Kingston-on-Thames, between the hours of 9 a.m. and 4 p.m., and until 1 p.m. on Saturdays. Tenders to be delivered not later than August 31, at noon.

SEPTEMBER 3.—**Burscough Bridge.**—OFFICES AND STORES.—The Lathom and Burscough U.D.C. invite

tenders for the erection of public offices and stores at Burscough Bridge. Plans and specifications can be inspected at the office of the architect, Mr. C. S. Beeston, Albany Buildings, Ormskirk, from whom bills of quantities and other information may be obtained. Tenders to be delivered at office of Mr. Fred. C. Hill, Clerk to the Council, 22, Derby-street, Ormskirk, not later than 12 noon on September 3, endorsed "Public Offices."

SEPTEMBER 3.—**Castleblayney.**—GOODS STORE.—Great Northern Railway Company (Ireland) Directors invite tenders for the erection of a goods store (90 ft. by 25 ft.) and office (20 ft. by 14 ft.) of timber, with galvanised corrugated iron roof, etc., at their Castleblayney Station. Parties wishing to tender may see the drawing and specification at the office of Mr. W. H. Mills, Engineer-in-Chief, Amiens-street terminus, Dublin, or copies of them at the office of the District Engineer, Belfast, and forms of tender can be obtained at either of the said offices on payment of 1s. (not returnable) each. Tenders, made out on the forms supplied by the company, and endorsed "Tender for Goods Store," should be delivered to Mr. T. Morrison, Secretary, Secretary's Office, Amiens-street terminus, Dublin, not later than 10 a.m. on September 3.

* SEPTEMBER 4.—**Birmingham.**—ENGINE-SHED, ETC.—The Directors of the Great Western Railway Company invite tenders for new engine-shed, etc., at Tyseley, near Birmingham. Plans and specifications may be seen, and forms of tender and bills of quantities obtained, at the office of the resident engineer, at Acocks Green Station, between 10 and 4. Tenders, addressed to Mr. G. K. Mills, Secretary, Paddington Station, W., and marked outside "Tender for Tyseley Engine-shed," by September 4.

* SEPTEMBER 4.—**Birmingham.**—NEW STABLES, ETC.—The Directors of the Great Western Railway Company invite tenders for new stables, cattle pens, etc., at Small Heath, Birmingham. Plans and specification may be seen, and forms of tenders and bills of quantities obtained, at the office of the resident engineer at Acocks Green Station, between 10 and 4. Tenders, addressed to Mr. G. K. Mills, Secretary, Paddington Station, W., and endorsed "Tender for Stables, etc., Small Heath," by September 4.

* SEPTEMBER 4.—**London.**—WORKS AND REPAIRS.—The Commissioners of H.M. Works and Public Buildings invite tenders for ordinary works and repairs to buildings, etc., in their charge in the London district for three and a half years from October 1, 1906. The printed schedule, with form of tender, may be obtained at H.M. Office of Works, Storey's Gate, S.W., between 11 and 5, on payment of 1l. Tenders to be delivered before 12 noon, September 4, addressed to the Secretary, H.M. Office of Works, Storey's Gate, S.W., and endorsed, "Tender for Ordinary Works and Repairs, London."

SEPTEMBER 10.—**Pendleton.**—EXTENSIONS OF CAR DEPOT.—Salford Tramways Committee invite tenders for contract 145, constructional steelwork; contract 146, builders' work, in the erection and completion of extensions to the Central Car Depôt, Frederick-road, Pendleton. Form of tender, specification, and bill of quantities for either contract may be obtained on application to the General Manager, Tramways Department, 32, Blackfriars-street, Salford, upon depositing a cheque for 2l. 2s. Plans can be inspected, and further particulars obtained, at the above-mentioned offices. Tenders, endorsed "Steelwork" or "Builders' Work," as the case may be, "Car Depôt Extensions," and addressed to the Chairman, Tramways Committee, Town Hall, Salford, must be delivered at office of Mr. L. C. Evans, Town Clerk, Town Hall, Salford, not later than 3 p.m. on September 10.

SEPTEMBER 11.—**Audenshaw.**—SCHOOL.—Lancashire Education Committee invite tenders for the erection of a new public elementary school at Audenshaw. The plans may be seen, and bills of quantities obtained, at the office of the County Architect, Mr. Henry Littler, 16, Ribblesdale-place, Preston, by payment of a deposit of 2l. Tenders must be delivered before 12 o'clock noon on September 11, sealed and endorsed, to Mr. W. F. Knott, Parish Offices, Ashton-under-Lyne.

SEPTEMBER 11.—**Benton.**—ALTERATIONS TO INSTITUTE.—Lancashire Education Committee invite tenders for the execution of alterations at the Benton Technical Institute. The plans may be seen, and bills of quantities obtained, at the offices of Messrs. J. W. Beaumont & Son, 10, St. James's-square, Manchester, on and after August 21. Tenders must be delivered before 12 o'clock noon on September 11, sealed and endorsed, to Mr. W. F. Knott, Parish Offices, Ashton-under-Lyne.

SEPTEMBER 12.—**Merthyr Tydfil.**—CHAPEL ADDITIONS.—Additions and improvements to Bethesda Congregational Chapel, Merthyr Tydfil. The plans and specifications can be seen with Mr. Rees Jones, grocer, Bethesda-street. The tenders to be sent, sealed and endorsed, to Mr. John Thomas, 90, Brecon-road, Merthyr Tydfil, not later than September 12. Messrs. Owen Morris Roberts, architects and surveyors, Portmadoc.

SEPTEMBER 17.—**Willowtown.**—SCHOOLS.—Ebbw Vale Education Committee invite tenders for the erection of new schools for boys, girls, and infants, together with cookery and manual instruction rooms, at Willowtown, Ebbw Vale. Plans, specifications, and conditions of contract may be seen at the office of the architect, Mr. Henry Waters Waungoch, Beaufort. Personal application must be made to the architect for the bills of quantities, accompanied by a deposit of 3l. 3s. Separate tenders are required for (1) the infants' block, (2) mixed block, (3) cookery and manual block, (4) the remainder of the works, and (5) the whole of the works. Tenders, enclosed in a sealed envelope, endorsed on the outside "Tender for Willowtown Schools," should be delivered at office of Mr. Tho. Hughes, Secretary, Ebbw Vale, on or before September 17.

NO DATE.—**Seaburn.**—VILLAS.—For the erection of a pair of semi-detached villas, Seaburn. For quantities apply Messrs. Frank Caws, Steel, & Caws, 22, Fawcett-street, Sunderland.

NO DATE.—**Wakefield.**—ADDITIONS, ETC., TO K.O.Y.L.I. DRILL HALL, BANK-STREET.—Additions and alterations in forming club-rooms, lavatories, sergeants'-room, etc. Names to Messrs. Simpson & Firth, Architects and Surveyors, Southgate-chambers, Wakefield.

NO DATE.—**Ynyshir.**—CONVERTING HOUSES INTO SHOPS.—For converting two houses into shops. Address sealed tenders, marked "Tender," by Saturday August 25, to Co-operative Stores, Ynyshir.

ENGINEERING, IRON, AND STEEL.

AUGUST 20.—**Bootle.**—FURNACES AND COVERINGS.—Bootle Corporation invite tenders for the supply of (1) Equipment of four boilers for hand-firing with bituminous slack; (2) smoke-preventing apparatus for same; (3) non-conducting covering for steam and water pipes, and boiler surfaces, to the Electricity Works, Pine-grove, Bootle. Copies of the specification, forms of tender, general conditions, etc., can be obtained from the Borough Electrical Engineer on depositing the sum of 1l. 1s. Tenders, endorsed "Furnaces and Coverings," to be addressed to the Chairman of the Electric Power and Lighting Committee, Town Hall, Bootle, and delivered at office of Mr. J. Henry Farmer, Town Clerk, Town Clerk's Office, Town Hall, not later than 10 a.m. on August 20.

AUGUST 20.—**Dublin.**—PIPES.—Dublin Lighting Committee invite tenders for the supply and erection of certain solid-drawn copper feed water-pipes at their Pigeon-house generating station. Specification, general conditions, and form of tender, can be obtained from the City Electrical Engineer, Fleet-street, Dublin, on payment of 1l. 1s. for each specification. Tenders, addressed "Chairman of the Lighting Committee, 3, Cork-hill, Dublin," and marked "Tender for Copper Piping," to be delivered not later than noon on August 20.

AUGUST 20.—**Lidgate.**—BRIDGE REBUILDING.—Moulton R.D.C. invite tenders for rebuilding a bridge at Lidgate, Suffolk. The plans and specifications can be seen at the offices of Messrs. Holland & Sons, High-street, Newmarket. Sealed tenders to be sent to Mr. S. J. Ennion, Clerk to the Council, Deva Chambers, Newmarket, not later than 10 o'clock in the forenoon of August 20, endorsed "Tender for Lidgate Bridge."

AUGUST 20.—**Rhondda.**—IRON FENCING.—Rhondda U.D.C. invite tenders for about 400 yds. of strong unclimbable iron fencing, 6 ft. high, with gates. Particulars may be obtained on application to Mr. W. J. Jones, engineer and surveyor, at the Public Offices, Pentre, Rhondda. Sealed tenders, endorsed "Fencing," to be sent in not later than August 20.

AUGUST 21.—**London.**—RAILS, ETC.—Bombay, Baroda, and Central India Railway Company Directors invite, up to noon on August 21, tenders for the supply of the following stores, viz.:—Class A.—(1) Steel rails; (2) fishplates; and (3) spikes. Tenders must be made on forms, copies of which, with specifications, can be obtained at offices of Mr. W. V. Constable, Secretary, Gloucester House, 2, 3, and 4, Bishopsgate-street Without, London, E.C., on payment of 1l. 1s. each (which will not be returned).

AUGUST 22-29.—**London.**—METAL INGOTS AND WAGGONS.—The East Indian Railway Company invite tenders for the supply and delivery of (1) white anti-friction metal ingots; (2) bogie waggons (for carrying rails, etc.), as per specifications to be seen at the Company's Offices. Tenders are to be sent to Mr. C. W. Young, Secretary, Nicholas-lane, London, E.C., not later than 12 o'clock noon, marked "Tender for White Metal Ingots," or as the case may be, for No. 1 on August 22, and for No. 2 on August 29. For each specification a fee of 1l. 1s. is charged, which cannot under any circumstances be returned.

AUGUST 22.—**Walton.**—OVENS.—West Derby Guardians invite alterations and additions in connection with the building of two new ovens at Walton Workhouse. Contractors having places of business and workshops, and being *bond-fide* contractors carrying on business within the Unions of West Derby, township of Toxteth Park, or the parish of Liverpool, may see specification and plans at the office of the architect, Mr. C. H. Lancaster, Brougham-terrace, West Derby-road, Liverpool. Sealed tenders, endorsed "Tender for Alterations to Ovens, Walton Workhouse," to be delivered to Mr. Harris P. Cleaver, Clerk to the Guardians, Brougham-terrace, West Derby-road, Liverpool, not later than 9 o'clock a.m. on August 22.

AUGUST 22.—**Walton.**—OVENS.—West Derby Guardians invite tenders for the erection and completion of two new steampipe peel ovens. Specification and particulars, also position of same on plan, can be seen at the office of the architect, Mr. C. H. Lancaster, Brougham-terrace, West Derby-road, Liverpool. Sealed tenders, endorsed "Tender for Ovens, Walton Workhouse," to be delivered to Mr. Harris P. Cleaver, Clerk to the Guardians, Brougham-terrace, West Derby-road, Liverpool, not later than 9 o'clock a.m. on August 22.

AUGUST 22.—**West Derby.**—ALTERATIONS TO BOILERS.—West Derby Guardians invite tenders for alterations and additions in connexion with new boilers, Mill-road Infirmary, from contractors having places of business and workshops, and being *bond-fide* contractors carrying on business within the Unions of West Derby, Township of Toxteth Park, or the Parish of Liverpool. Specifications and plans can be seen at the office of the architect, Mr. C. H. Lancaster, Brougham-terrace, West Derby-road, Liverpool. Sealed tenders, endorsed "Tender for Alterations, New Boiler, Mill-road Infirmary," to be delivered to Mr. Harris P. Cleaver, Clerk to the Guardians, Brougham-terrace, West Derby-road, Liverpool, not later than 9 a.m. on August 22.

AUGUST 22.—**West Derby.**—BOILER.—West Derby Guardians invite tenders for the supplying and fixing one new multitubular marine dry-backed boiler, complete with all fittings, steam-pipings, fan, etc. Specifications and plan can be seen at the Steward's office, Infirmary, Mill-road, Liverpool. Sealed tenders, endorsed "Tender for Boiler, Infirmary," to be delivered to Mr. Harris P. Cleaver, Clerk to the Guardians, Brougham-terrace, West Derby-road, Liverpool, not later than 9 a.m. on August 22.

AUGUST 24.—**Hopetoun.**—RAILWAY.—Young's Paraffin Light and Mineral Oil Company, Ltd., invite tenders for the construction of fully a mile of private railway, with sidings leading to No. 41 Mine, Hopetoun. Also, for construction of haulage way to Spent Shale Bing, at Hopetoun Works. Drawings may be seen, and specifications and schedules obtained, from Messrs. D. & G. R. Rankine, civil and mining engineers, 238, West George-street, Glasgow. The works will be pointed out on August 17, leaving Uphall Station in conveyance provided by the Company after arrival of trains from the East and West, due shortly after 11 o'clock. Offers to be lodged with Mr. John Fyfe, Managing Director, 7, West George-street, Glasgow, on or before August 24.

AUGUST 28.—**Climping.**—GROYNES.—The erection of three wooden groynes, average 300 ft. in length, and for the extension by 150 ft. of an existing groyne, on the foreshore at Climping, Sussex. Plans and specifications can be seen at the office of Mr. Arthur Holmes, Clerk to the Commission of Sewers for the Rape of Arundel, Arundel, between the hours of 10 and 4 any day. Tenders, marked "Tender for Groynes," to be delivered to the Clerk on or before August 28.

AUGUST 28.—**Lambeth.**—STEAM PIPE.—Lambeth Board of Guardians invite tenders for the providing and fixing of about 170 yds. of 3-in. to 5-in. steam pipe, with valves and accessories, at their Workhouse, Renfrew-road, Lower Kennington-lane, S.E. Specification and form of tender can be obtained from the Consulting Engineer to the Guardians, Mr. George E. Arnold, 195, Kennington-road, S.E., and form of contract can be seen at that address. Tenders must be sent by post not later than August 28 to Mr. W. Thurnall, Clerk to the Guardians, Guardians' Board Room and Offices, Brook-street, Kennington-road, S.E., sealed, and superscribed "Tender for Steam Pipes."

AUGUST 29.—**Bradford.**—HOT-WATER SUPPLY.—The Bradford Corporation invite tenders for hot-water supply apparatus at the City Hospital, Leeds-road. Drawings and general conditions of contract may be seen, and bill of quantities and form of tender obtained, on application to the City Architect, Whitaker Buildings, Brewery-street, Bradford. Sealed and endorsed tenders must be sent to Mr. Frederick Stevens, Town Clerk, Town Hall, Bradford, not later than 12 o'clock noon on August 29.

* SEPTEMBER 6.—**Islington.**—ENGINEERING WORKS.—The Guardians of St. Mary, Islington, invite tenders for (1) provide and fix hot water and heating arrangements; (2) fire mains and hydrants; (3) gas supply and fittings; (4) electrical installation at the two new blocks now being erected at the St. John's-road Workhouse, Upper Holloway. Copies of specification and further particulars, with forms of tender, can be had of Mr W. Smith, architect, 65, Chancery-lane, W.C., up to August 30, on deposit of 2l. Tenders, addressed to the Guardians, and to be delivered at the Offices, St. John's-road, Upper Holloway, N., before 2, September 6, endorsed "Tender for ——."

SEPTEMBER 11.—**Newcastle-on-Tyne.**—STEEL RAILS, POINTS, AND CROSSINGS.—The Tramways Committee of the Corporation of Newcastle-upon-Tyne invite tenders for the supply of rails, points, and crossings, together with the necessary fishplates, tie-rods, bolts and nuts, in connection with the renewal and extension of a double junction in Northumberland and Blackett streets. Alternative offers are asked for, viz.:—(1) In hardened cast-steel points and crossings and rolled-steel rails; (2) in manganese steel throughout. Plans may be seen, and specifications, schedule of quantities, and form of tender obtained, at the office of the City Engineer, Town Hall, Newcastle-upon-Tyne, on payment of 1l. 1s. Tenders endorsed "Tender for Renewal, etc., of Northumberland-street Junction," and addressed to the Chairman of Tramways Committee, to be delivered at the City Engineer's Office on or before September 11.

NO DATE.—**Swansea.**—SLUICES AND MACHINERY.—The Swansea Harbour Trustees invite tenders for five pairs of main sluices and ten pairs of supplementary stop paddles, together with hydraulic and hand-power machinery for working them. On and after August 27 drawings may be inspected between 11 a.m. and 4 p.m. at the office of the Trustees' Engineer, Mr. A. O. Schenk, M.Inst.C.E., Harbour Offices, Swansea, and copies of the drawings, specification, conditions, and forms of, and instructions for, tender may be obtained of Mr. Talfourd Strick, Clerk, Harbour Offices, Swansea, on payment of 5l. 5s.

MISCELLANEOUS.

AUGUST 20.—**Linthwaite.**—WALLING.—Linthwaite Industrial Co-operative Society, Ltd., invite estimates for 220 yds. of dry walling. Particulars on application to the Central Stores. Tenders to be sent in not later than August 20.

AUGUST 21.—**Belfast.**—FITTING-UP BATHS.—Belfast Board of Guardians invite proposals for fitting-up and completing five baths and the heating by steam of a dormitory at girls' school department of the Workhouse, in accordance with plan and specification prepared by Messrs. Young & Mackenzie, civil engineers. Tenders, endorsed "Baths," to be lodged in the tender box, board-room, before 12 o'clock noon on August 21. Mr. Joseph W. Robb, Clerk of the Union, Clerk's Office, Union Workhouse.

AUGUST 22.—**Houghton-le-Spring.**—GAS.—The Houghton-le-Spring U.D.C. invite tenders for the supply of gas for lighting the public street lamps for the year ending August 31, 1907. Tenders to be delivered to Mr. D. Miller, Clerk of the Council, Houghton-le-Spring, not later than August 22.

AUGUST 23.—**Manchester.**—OIL.—Manchester Corporation Gas Committee invite tenders for the supply of a cargo, by December 20 next, of 3,000 to 3,500 tons of oil for the manufacture of carburetted water-gas. Description of the oil, conditions of contract, and further particulars may be obtained on application (in writing only) to Mr. Charles Nickson, Superintendent of the Gas Department. Sealed tenders and samples, addressed to the Chairman of the Gas Committee, and endorsed "Tender for Gas Oil," must be delivered at the office of the Superintendent of the Gas Department, Town Hall, Manchester, on or before August 23.

AUGUST 23.—**Prestwich.**—POINTING WALLS.—Prestwich Guardians invite tenders for a quantity of pointing at their Workhouse, Delaunays-road, Crumpsall. Tenders, endorsed "Tender for Pointing," to be addressed to Mr. Edward W. Ogden, Clerk to the Guardians, Union Offices, Cheetham

Hill-road, Manchester, and delivered by 10 a.m. on August 23.

AUGUST 25.—**Newcastle-under-Lyme.**—FURNISHING KING'S MEMORIAL BATHS.—Tenders are invited for the furnishing of the Turkish baths. Building now in course of erection. Particulars may be obtained from Mr. J. B. Langley, architect, 49, Deansgate, Manchester. Tenders, endorsed "Tender for Furnishing Turkish Baths," to be sent to Mr. Joseph Griffith, Town Clerk, Town Clerk's Office, Newcastle-under-Lyme, on or before August 25.

AUGUST 25.—**Wrotham.**—EMPTYING OF CESSPOOLS.—The Wrotham U.D.C. invite tenders for working the cesspool-emptying plant within their district, for one year, from September 29, 1906, as per specification, to be seen at the office of the surveyor, Mr. A. J. H. Powell, Borough Green. Tenders to be sent to Mr. George F. Carnell, Clerk to the Council, 130, High-street, Sevenoaks, sealed and endorsed outside "Tender for Cesspool Emptying," not later than noon on August 25.

AUGUST 27.—**Brechin.**—BOWLING GREEN.—The Royal Burgh of Brechin invite offers for the construction of a bowling green in Brechin Public Park. For particulars apply to Mr. Wm. Eggie, Burgh Surveyor, Brechin, who will supply copies of specification and schedule of quantities on payment of 1*l.* 1s. Marked tenders to be lodged with the subscriber not later than August 27.

✱ AUGUST 27.—**Hendon.**—SHELTER.—The Hendon U.D.C. invite tenders for a wood and corrugated iron shelter to be erected in the Hendon Public Park, N.W. Drawings and specifications may be seen, and forms of tender obtained, of Mr S. Slater Grimley, Engineer, Council Offices, Hendon, N.W. Tenders, on such forms only, endorsed "Shelter," addressed to the Chairman of the Council, to be sent to Mr. H. Humphris, Clerk, Council Offices, Hendon, N.W., before 4, August 27.

AUGUST 27.—**Sunderland.**—CARTING.—Sunderland R.D.C. invite tenders for carting road material, being the balance of the metal required during the half-year ending March 31, 1907, viz., in the Parish of Ryhope and the Parish of Tunstall. Tender forms, which may now be obtained on application to Mr. J. C. Wilson, Clerk to the Council, Clerk's Office, 17, John-street, Sunderland, to whom they must be returned not later than August 27, marked "Tender for Carting."

AUGUST 27.—**Warrington.**—MOTOR.—Warrington Sanitary Works Committee invite tenders for the supply of one 10 B.H.P., D.C. motor. Specification can be obtained from Mr. James J. A. Parfitt, Cleansing Superintendent, Cleansing Dept., Warrington, on payment of 1*l.* 1s. to the Borough Treasurer, Bank House, Sankey-street, Warrington. Tenders, in securely-fastened envelopes, endorsed "Tender for Motor," and addressed to the Chairman, Sanitary Works Committee, Town Hall, Warrington, to be delivered not later than 10 a.m. on August 27.

AUGUST 31.—**New Malden.**—FENCING.—The Guardians of the Kingston Union invite tenders for the provision and erection of wrought-iron unclimbable fencing at Norbiton Common Farm, New Malden, Surrey. A copy of the specification and form of tender may be obtained on application to Mr. Jas. Edgell, solicitor, Clerk to the Guardians, Union Offices (opposite Norbiton Railway Station), Kingston-on-Thames. Tenders to be delivered not later than August 31, at noon.

SEPTEMBER 12.—**Barking Town.**—LIGHTING.—The U.D.C. of Barking Town invite tenders for the cleaning, lighting, extinguishing, renewal of lamps, lanterns, fittings, etc., of the whole of the public street incandescent, Nernst, and Arc lamps within their district for alternative periods of 1, 2, or 3 years. Form of tender, conditions, and specification may be obtained from the Engineer at the Electricity Works, East-street, Barking. Sealed tenders, endorsed "Street Lighting," addressed to the Chairman of the Electricity and Tramway Committee, must be delivered to Mr. H. Hargreaves, Clerk of the Council, Public Offices, Barking, not later than 12 o'clock noon on September 12.

SEPTEMBER 15.—**Handsworth.**—ELECTRIC WIRING, ETC.—The U.D.C. of Handsworth invite tenders for the supply and fixing of the following:—Wiring, fittings, etc., for the electric lighting of the new Council schools, Canterbury-road, Handsworth; wiring, fittings, etc., for the electric lighting of the new Council schools, Westminster-road, Handsworth. Drawings, specifications, and conditions of contract may be obtained on and after September 1, from Mr. F. A. Nixon, electrical engineer, Generating Station, Soho-road, Handsworth, on payment of 1*l.* 1s. Tenders, on the prescribed form, must be sealed and forwarded in the endorsed envelope supplied for that purpose, and should be delivered at the Education Offices not later than September 15.

No DATE.—**Plumstead.**—ELECTRIC INSTALLATION.—The Guardians of the Woolwich Union require tenders for rearrangement of a portion of their electric installation at Plumstead Infirmary. Firms desirous of tendering should communicate with Mr. Tom Cutter, Clerk to the Guardians, Union Offices, Plumstead, and a copy of the specification of the necessary works will be sent to applicants on receipt of a deposit of 2*l.* 2s.

No DATE.—**Rochdale.**—ASPHALTING.—For Asphalting work. Apply Mr. J. White, Dunster, Rochdale.

No DATE.—**Rochdale.**—CABLE CONDUITS.—Rochdale Electricity Committee invite tenders for cable conduits. For particulars apply to Mr. C. C. Atchison, Electricity Works, Dane-street, Rochdale.

No DATE.—**Rochdale.**—WOODWORK.—The woodwork of two houses to be erected on the Dunster Estate. Apply J. White, Dunster, Rochdale.

PAINTING, etc.

AUGUST 20.—**Gosport.**—PAINTING, ETC.—Gosport and Alverstoke U.D.C. invite tenders for the exterior painting, etc., at the Council Offices, Free Library, Fire Station, Air Compressing Station, Cemetery, and Park. Specifications may be seen, and further particulars, with forms of tender, obtained at the surveyor's office. Tenders, endorsed "Tender for Painting," to be delivered to Mr. E. Talbot Palmer, Clerk to the Council, Gosport, not later than noon on August 20.

AUGUST 22.—**Sheffield.**—PAINTING.—Sheffield Guardians invite tenders for painting the wood and iron work outside certain of the buildings at the Workhouse at Fir Vale, in accordance with a specification prepared by the Clerk of Works, which may be seen, and further particulars obtained, on application at the Workhouse. The work will be divided into three sections, which must be tendered for separately. Tenders, marked "Painting," must be sent to Mr. Albert Edwd. Booker, Clerk to the Guardians, Union Offices, Westbar, Sheffield, before 12 o'clock noon on August 22.

AUGUST 23.—**Greenwich.**—PAINTING, ETC.—The Guardians of the Greenwich Union invite tenders for cleaning, painting, colouring, and general repairs to the Relief Office and Dispensary, Royal-hill, Greenwich. Copy of the specification will be furnished upon application to Mr. Louis Jacob, A.R.I.B.A., architect and surveyor, Globe-chambers, 493, New Cross-road, and payment of 1*l.* deposit. Tenders to be sealed and endorsed "Tender for Painting, etc., Relief Office," directed to Mr. S. Saw, Clerk to the Guardians, Guardians' Offices, Greenwich Union, S.E., and delivered before August 23.

✱ AUGUST 30.—**Stepney.**—PAINTING, ETC.—The Guardians of the Stepney Union invite tenders for certain distempering and painting works at Children's Receiving Home, Barnes-street, Ratcliff, E., their casual wards, Eastfield-street, Limehouse, E., and 45, Barnes-street, Ratcliff, E. Specifications and forms of tender, etc., can be obtained of Mr. T. G. Stacey, Clerk, Guardians' Offices, Barnes-street, Ratcliff, E., and to whom tenders must be delivered before 4, August 30.

AUGUST 30.—**Sunderland.**—PAINTING.—Sunderland Corporation invite tenders for the painting of 180 tramway poles. Specification and form of tender may be obtained on application to the General Manager, at his office, Wheat Sheaf-corner, Monkwearmouth. Tenders, in a sealed envelope, endorsed "Tender for Painting Tramway Poles," must be delivered at office of Mr. Fras. M. Bowey, Town Clerk, Town Hall, Sunderland, not later than 12 noon on August 30.

✱ SEPTEMBER 12.—**West Ham.**—PAINTING, ETC.—Tenders invited by the Council of the above borough for painting, cleansing, repairs, etc., of public buildings. Specifications, form of tenders, and further particulars of Mr. John G. Morley, Borough Engineer, Town Hall, West Ham, on payment of 1*l.* Tenders to be endorsed "Tender for Painting, etc., Works," and sent to Mr. Fred. E. Hilleary, Town Hall, West Ham, E., by 4 p.m., September 12.

No DATE.—**Port Talbot.**—CLEANING AND PAINTING.—For cleaning and painting all roofs, girders carrying same, and gantry cranes, at Port Talbot Steel Works. Approximate area roofs, 4,700 sq. yds. Approximate length girders, 2,200 ft. Address tenders to Baldwins, Ltd., Landore.

No DATE.—**Rochdale.**—PAINTING.—The Rochdale Corporation invite tenders for painting garden chairs, hurdles, etc., at Falinge Park. For further particulars apply to the Borough Surveyor, Town Hall.

ROADS, SANITARY, AND WATER WORKS.

AUGUST 21.—**Acton.**—MAKING-UP.—Acton U.D.C. invite tenders for making-up Twyford-avenue from Creffield-road to the Great Western Railway. Plans and specifications can be seen, and bills of quantities obtained, at 57, High-street, Acton, during office hours. Tenders to be delivered at the Council Offices, 242, High-street, Acton, W., not later than 3 p.m. on August 21.—Mr. D. J. Ebbetts, Surveyor to the Council, 57, High-street, Acton, W.

AUGUST 21.—**Bargoed and Gilfach.**—STREET WORKS AND DRAIN.—Gelligaer and Rhigos R.D.C. invite tenders for work required to be done in taking-up kerb, channel, and pavement, relaying same, and laying down new kerb, channel, and pavement; also laying surface-water drain, etc., at Heol Ddu, Bargoed. Tenders are also required for work to be done in laying new 6-in. stoneware pipe drains, about 210 yds. in length, with necessary manholes, etc., at Thomas-street and Llewellyn-street, Gilfach. Plans and specifications can be seen, and bills of quantities obtained upon application to the Council's Surveyor, Mr. James P. Jones, Council Offices, Hengoed, *vid* Cardiff. Sealed tenders, endorsed "Street Works and Drain," to be sent to Mr. Frank T. James, Clerk, 134, High-street, Merthyr Tydfil, on or before August 21.

AUGUST 22.—**Holywell Green.**—PAVING.—The Stainland-with-Old-Lindley U.D.C. invite tenders for paving about 767 super. yds. with new 7-in. setts, and other works in connexion therewith, at Holywell Green. Specifications may be seen, and full particulars obtained, on personal application at the surveyor's office. Tenders, sealed and endorsed "Tender for Paving, etc.," must be delivered to Mr. James H. Walker, Surveyor, Surveyor's Office, Mechanics' Hall, Stainland, not later than 5 o'clock on August 22.

AUGUST 22.—**Oldham.**—SEWERING AND PAVING.—Oldham Surveyor's Committee invite tenders for the sewering and paving of:—Passage leading from Egerton-street to Spencer-street, lying between Wallshaw-street and Beechey-street; passage leading from Beechey-street to Gower-street, at the rear of Nos. 59 to 75, Spencer-street; passages between Spencer-street and Lemnos-street, lying between Gower-street and Bell-street; passages off Brackley-street at the rear of Nos. 83 to 95, Egerton-street, and at the rear of Nos. 1 to 13, Brackley-street; passages between Egerton-street and Douglas-street, lying between Brackley-street and Bridgwater-street; passages between Egerton-street and Moorby-street, lying between Bridgwater-street and St. Stephen's-street; passages between Egerton-street and Bolderod-place, lying between St. Stephen's-street and Edge Lane-road. Also for the sewering, paving, flagging, and completing of Cobden-street (part of). Plans and specifications can be seen, and quantities and forms of tender obtained, at the office of the Borough Surveyor. Sealed tenders, endorsed "Tender for Private Street Works," and addressed to the "Chairman of the Surveyor's Committee," to be returned not later than August 22, Mr. J. H. Hallsworth, Town Clerk, Town Hall, Oldham.

AUGUST 24.—**Birmingham.**—SEWER.—Birmingham Public Works Committee invite tenders for the reconstruction of a length of about 45½ yds. of 3 ft. 6 in. brick barrel sewer and about 27 yds. of 3 ft. 6 in. by 2 ft. 6 in. egg-shaped sewer, together with manholes, junction bell-mouth, and other incidental works. The plans and specification may be seen, and quantities and forms of tender obtained, on deposit of a sum of 2*l.* Tenders, sealed and endorsed "Sandy-lane Sewer," and addressed to the Chairman of the Public Works Committee, must be delivered at office of Mr. Henry E. Stilgoe, City Engineer and Surveyor, The Council House, Birmingham, not later than August 24.

AUGUST 24.—**Rhondda.**—PAVING, ETC.—Rhondda U.D.C. invite tenders for paving, kerbing, and channelling (1) Hannah-street, Porth; (2) Ynyscynon-road and Partridge-road, Trealaw. Plans may be seen, and specification and forms of tender obtained, at the Council Offices, Pentre, on depositing the sum of 1*l.* 1s. for each section. Sealed tenders must be delivered not later than first post on August 24, and addressed to the Chairman of the Council, Council Offices, Pentre. Mr. W. J. Jones, Engineer and Surveyor, Council Offices, Pentre, Rhondda.

✱ AUGUST 25.—**Borden.**—NEW ROADS, ETC.—The War Department invite tenders for new roads, completing existing roads and parades, and the execution of certain surface drainage, etc., at the Royal Field Artillery Lines, Borden Barracks, Hampshire. Drawings and specifications may be inspected, and bills of quantities obtained, at the office of Mr. Harry B. Measures, F.R.I.B.A., Director of Barrack Construction, Atterbury-street, Grosvenor-road, S.W., from August 22 to 25 inclusive, on payment of 10s.

AUGUST 27.—**Cowdenbeath.**—DRAINAGE WORKS.—The Town Council of the Burgh of Cowdenbeath invite tenders for additional drainage works within the Burgh. Plans and sections of the works may be seen, or copies of specifications and schedules of measurement may be obtained, at the office of Messrs. Buchan & Bennett, C.E., 12, Hill-street, Edinburgh; and assistant engineers will meet any intending offerers at Cowdenbeath Railway Station on August 20, at 10.30 a.m., to point out the lines of the proposed works. Tenders (marked "Additional Drainage Works") are to be lodged with Mr. Geo. Terris, Town Clerk, Cowdenbeath, not later than August 27.

AUGUST 28.—**Leatherhead.**—ROAD WORKS.—Leatherhead U.D.C. invite tenders for widening, reforming, kerbing, and providing and laying 1,423 yds. of 12-in. and 9-in. stoneware storm-water drain in connexion with the improvement of a portion of Kingston main road. Also for the providing and laying of about 300 lin. yds. of 9-in. diameter sewer, with all necessary manholes, etc., in the Oxshott-road. The drawing and draft contract may be seen, and copies of the specification, of tenders, and schedules of work obtained, at the office of Mr. J. E. Smales, Engineer and Surveyor, Council Offices, Leatherhead, upon payment of the sum of 3*l.* 3s. Tenders, sealed and endorsed "Road Improvement," to be sent, addressed to the Clerk of the Leatherhead U.D.C., on or before 4 p.m. on August 28.

✱ AUGUST 28.—**Mayland.**—WATER SCHEME.—The Maldon R.D.C. invite tenders for supply and laying of about 4,000 yds. of 3-in. cast-iron water mains in the Parish of Mayland. Specification and form of tenders may be obtained of Messrs. Price & Belsham, 52, Queen Victoria-street, E.C., on deposit of 2*l.* 2s. Copies of the same may be seen at, but not obtained from, the offices of the Maldon R.D.C., 6, Market-hill, Maldon, Essex. Tenders, endorsed "Mayland Water Scheme," addressed to Mr. A. W. Freeman, Clerk to the Council, Maldon, Essex, on or before August 28.

AUGUST 28.—**Morecambe.**—SEWERAGE WORKS.—The Morecambe Town Council invite tenders for the construction of certain intended stoneware and cast-iron pipe sewers in connexion with the sewerage works of the town of Morecambe, together with manholes, ventilators, connexions, and other works, the whole to be let in one contract. Drawings and specification may be seen at the offices of the engineers, Messrs. Beesley, Son, & Nichols, MM.Inst.C.E., of 11, Victoria-street, Westminster, S.W., where also specification, bills of quantities, and forms of tender can be obtained on deposit of 5*l.* Copies of the plans and specification may also be seen at Town Hall, Morecambe. Sealed tenders, addressed to Mr. William Tilly, Town Clerk, Town Hall, Morecambe, and endorsed "Sewerage Works, Contract No. 3," are to be delivered at Morecambe before 10 a.m. on August 28.

SEPTEMBER 1.—**Swanage.**—MAKING-UP ROAD.—Swanage U.D.C. invite tenders for making-up a certain road on the De-Moulham Estate, Swanage, viz., Cranborne-road. The works are to be done in accordance with plans, specifications, and conditions prepared by the Surveyor to the Council, which can be seen at Town Hall between the hours of 10 a.m. and noon on any day except Sunday. Tenders must be furnished on forms which can be obtained at the Council Office, and must be sent to Mr. Thomas Randell, Clerk, in a sealed envelope, marked outside "Tender for Making-up Cranborne-road," before noon on September 1. A deposit of 1*l.* 1s. will be required for form of tender supplied.

✱ SEPTEMBER 5.—**Whiston.**—SEWERAGE WORKS.—The Whiston R.D.C. invite tenders for about 17,390 lin. yds. of glazed earthenware and cast-iron pipe sewers, varying in diameter from 15 in. to 9 in., together with manholes, lamp-holes, flushing chambers, sewage tanks, etc. The drawings may be seen, and copies of the specification and quantities obtained, at the office of the engineer, Mr. John T. Wood, 3, Cook-street, Liverpool, on deposit of 5*l.* Sealed tenders, endorsed "Tender for Sewerage Works," to be delivered to Mr. A. F. Manor, Union Offices, Whiston, Prescot, on or before September 5.

SEPTEMBER 6.—**Surbiton.**—DRAINAGE WORKS.—Surbiton U.D.C. invite tenders for the construction of main drainage works. The drawings, specification, bills of quantities, and forms of tender, may be inspected at the offices of the engineer, Mr.

Nicholson Lailey, M.Inst.C.E., 53, Victoria-street, Westminster, between 10 a.m. and 5 p.m. (Saturdays excepted), until September 3. Tenders, sealed and endorsed "Surbiton Main Drainage," are to be addressed to Mr. F. J. Bell, Deputy Clerk, Surbiton U.D.C. Offices, Ewell-road, Surbiton, and delivered on September 6 by 12 o'clock noon. A deposit of 10*l.* Bank of England note will be required.

SEPTEMBER 7.—**Caistor.**—WATER MAIN.—The R.D.C. of Caistor invites tenders for the construction and testing of a new water main at Moortown. The plans, general conditions, and specifications can be seen, and bill of quantities and form of tender for the contract can be obtained, on payment of 2*l.* 2s., at the offices of the Council at Caistor, and also at the offices of the engineer, Mr. E. J. Silcock, M.Inst.C.E., 10, Park-row, Leeds. Sealed tenders, endorsed "Moortown Water," must be delivered to Mr. A. A. Padley, solicitor, Clerk to the Council, Council Offices, Caistor, not later than September 7.

SEPTEMBER 10.—**Harpenden.**—ROAD-MAKING.—The U.D.C. of Harpenden, Herts, invite tenders for draining, levelling, paving, metalling, kerbing, channelling, and making good Douglas-road, Harpenden. Plans, sections, specifications of works and materials, and general conditions may be seen between the hours of 9.30 and 10.30 a.m., and bills of quantities and forms of tender may be obtained (on deposit of cheque for 1*l.* 1s.), upon application to Mr. John H. Leverton, Surveyor, the Public Hall, Harpenden. Sealed tenders, together with fully-priced quantities, endorsed "Tender for Private Street Works," to be delivered at office of Mr. Chas. S. Tuckey, Clerk to the Council, High-street, Harpenden, before 12 noon on September 10.

SEPTEMBER 11.—**Llanfrechfa.**—DRAINAGE.—Llanfrechfa Upper U.D.C. invite tenders for the construction of main sewers and outfall works for their Urban District, comprising about 2,368 lin. yds. of 6-in. and 15-in. stoneware pipe sewers, 141 lin. yds. 6-in. and 15-in. cast-iron pipe sewers, with necessary manholes, settling tanks, etc. Plans may be seen, and copy of specification and bill of quantities obtained, on payment of 2*l.* 2s., at the office of Mr. Isaac Jones, Clerk to the Council, Haddon House, Pontnewydd, Newport, Mon., by whom tenders will be received not later than noon on September 11.

STONE, MATERIALS, AND STORES.

AUGUST 20.—**London.**—RED AND WHITE LEAD.—Bengal and North-Western Railway Company Directors invite tenders for supply and delivery of red and white lead, as per specification to be seen at the company's offices. Tenders, addressed to Mr. Alexander Izat, Managing Director, 237, Gresham House, Old Broad-street, London, E.C., and marked "Tenders for Red and White Lead," are to be lodged not later than noon on August 20. For each specification a fee of 10s. will be charged, which cannot, under any circumstances, be returned.

AUGUST 25.—**Bromley.**—MATERIALS FOR ROADS, ETC.—Bromley R.D.C. invite tenders for the supply of field-picked flints, granite and ragstone of approved quality, and for the carting of gravel, from the date of the execution of the contract to September 30, 1907, for the following parishes:—Chelsfield, Cudham, Downe, Farnborough, Hayes, Keston, Knockholt, Mottingham, North Cray, Orpington, S. Mary Cray, S. Paul's Cray, West Wickham. Separate tenders must be made in respect of each item as separately numbered on the form of tender relating to each parish. Tenders to be delivered to Mr. Edward Haslehurst, Clerk to the Council, Park House, Bromley, Kent, prepaid, not later than 1 o'clock on August 25. Forms of tender may be obtained at the offices of the Council, and no other forms will be accepted. Tenders received after August 25 will not be entertained.

AUGUST 30.—**Bradford.**—STORES.—Bradford Gas Committee invite tenders for the supply of the following stores required in their several departments during a period of one year ending September 30, 1907:—Wet and dry gas meters; pipes and castings, wrought-iron steam tubing, best merchant iron and steel, 30 tons; charging shovels, 70 doz.; oxide wiskets, 25 doz.; cotton waste, 60 cwt.; best engine oil, 1,500 gall.; common oil, 1,800 gall.; cylinder oil, 1,000 gall.; tarred gaskin, 90 cwt.; brass main gas cocks, 160 doz.; weed brooms, 72 doz.; best lime, 120 tons; copper lamps, 500; lamp irons, 300; sheet glass for street lamps, 21 oz., 9,000 sq. ft.; opal glass for street lamps, 21 oz., 3,500 sq. ft. Forms of tender, with any further information required, may be had on application to Mr. Chas. Wood, Gas Engineer, Town Hall, and samples may be seen at Mill-street Gas Works. Tenders, endorsed "Tender for Stores," to be sent to Mr. Frederick Stevens, Town Clerk, Town Hall, Bradford, not later than August 30.

SEPTEMBER 1.—**Loughton.**—GRANITE, ETC.—Loughton U.D.C. invite tenders for the supply of the following: Granite—300 tons, broken to 1½ in., delivered in quantities as desired, free at Loughton or Chigwell-lane Railway Stations (G.E.R.); gravel—500 yds. clean gravel, delivered at Loughton when and where required; boggin and destructor clinker—50 yds. of each, delivered to Loughton Station in 5-ton truck loads. Tenders, marked on the outside "Materials," must be delivered to Mr. J. H. Hayward, Clerk to the Council, Council Offices, Loughton, Essex, not later than 12 o'clock noon, September 1.

SEPTEMBER 10.—**Bishop's Stortford.**—STEAM ROAD-ROLLER.—The Bishop's Stortford U.D.C. invite tenders for the supply and delivery of a 10-ton steam road-roller. Tenders, accompanied by a complete specification of the roller proposed to be supplied, and stating when it can be delivered, to be sent to Mr. Thomas Swatheridge, Clerk, Council Offices, 7, North-street, Bishop's Stortford, by September 10.

SEPTEMBER 12.—**Kingston.**—GRANITE.—Kingston-upon-Thames Corporation invite tenders for the supply of 1,250 tons of Quenast, Guernsey, or other granite, suitable for road-making, the whole of such granite to be broken so as to pass through a ring having a 1½ in. internal diameter. Tenders to be on forms to be obtained of the Borough Surveyor, at the Municipal Offices, where samples must be left. Sealed tenders, endorsed, to be delivered at office of Mr. Harold A. Winser, Town Clerk, Town Clerk's Office, Kingston-upon-Thames, on or before September 12.

NO DATE.—**Durham.**—PIPES.—The supply and delivery at Durham Station of 207 yds. 18-in. cast-iron pipes, 1 in. thick, 5 ft. lengths. Messrs. John Laing & Son, Millbourne-street, Carlisle.

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*BUILDER'S STOCK AND PLANT, DEDDINGTON, OXON—On the Premises	Paxton & Holiday	Aug. 27 & 28
*CONTRACTOR'S PLANT, PLYMOUTH	Alfred Parkhouse	Sept. 4
*FREEHOLD BUILDING LAND, ETC., WALLINGTON, SURREY—At the Mart	Robt. W. Fuller, Moon, & Fuller	Sept. 12
*JOINERY WORKS, HENRY-STREET, GRAY'S INN-ROAD	May & Rowden	Oct. 3
*FREEHOLD PROPERTIES, GODALMING—King's Arms Hotel, Godalming	Messrs. Mellersh	Oct. 9

LEGAL.—*Continued from page 241.*

His lordship said they could shore both sides.

Mr. Buckmaster said that the party wall was a structure that was not safe, and it seemed to him that the defendant ought to be restrained from further pulling down his building in such a manner as to cause a danger to the party structure. That was the least that the plaintiff was entitled to. The defendant said that the premises adjoining No. 422 were premises that had a gable roof to the Strand with a cross gable roof at the back, and all that had been done was to remove the tiles and the slating from the gable roof.

His lordship asked Mr. Cozens-Hardy what the defence was?

Mr. Cozens-Hardy said his case was that the defendant had not touched the wall at all. He had not been near it or touched any part of it. But he was willing to give an undertaking not to interfere with any support until the machinery of the Act had been worked out.

His lordship said that the proper form would be "without prejudice to any directions given in the London Building Act the defendant should be restrained from taking the wall down."

Mr. Cozens-Hardy said that he was perfectly willing to give an undertaking in that form. The defendant had not touched the party wall and he had no intention of touching anything that supported the party wall until after it had been dealt with under the Act.

His lordship, upon the defendant giving the undertaking in question, made no order on the motion and directed that the costs of the motion should be made costs in the action.

Patents of the Week.

APPLICATIONS PUBLISHED.*

16,633 of 1905.—T. E. DEVONSHIRE and H. STEPHENS: *Construction of Floors and Ceilings and Blocks for use in such Construction.*

This relates to the construction of floors and ceilings and to blocks for use in such construction. The blocks or slabs are made arch-shaped on their upper sides and preferably flat on their under-sides and hollow for the passage of air, the hollows being arranged so that they run longitudinally to the supporting joists, or girders. The metal network, expanded metal, or the like extends throughout both the upper or arched portions of the lower or soffit portion of the blocks or slabs, and the said blocks or slabs are strengthened by a rod or bar of metal extending through the said blocks or slabs so that one end of the said rod or bar is adapted to be supported on the lower flange of one joist or girder, and the other end of the said rod or bar is adapted to be supported on the lower flange of the opposite joist or girder.

18,707 of 1905.—J. THOMAS: *Fire Doors and Door Frames for the Grates of Domestic Boilers or Set Pots.*

This relates to a reversible door frame, for the fireplaces of domestic washing boilers formed with pinholes or sockets in the body of the frame and having pins or parts which taper from the back to the front, so as to more firmly bind the frame in position in the brickwork.

18,764 of 1905.—A. W. BOON: *Fastener or Holder for the Cords of Window-blinds and the like.*

This relates to a fastener or holder for blind cords and other purposes, consisting of a base and an arm or shank provided with a head and pivotally mounted on said base, said arm or shank being adapted to be turned towards the upper part of the base by the weight or pull of the blind or other body so as to retain said blind or body in position, and to automatically assume its horizontal or inoperative position when relieved from the action of the blind.

23,453 of 1905.—M. J. ADAMS: *Combination of a Lavatory Basin and Filling Apparatus.*

This relates to the combination of a lavatory basin and filling apparatus in which the lavatory basin is hung upon pivots, and has an extension or cup, which dips into the water vessel when the lavatory is tipped upwards. When the lavatory basin is brought down to its position for use it causes the water in the cup to be raised and emptied into the basin ready for use, the lavatory basin and cup being arranged in the manner of a "see saw."

1,407 of 1906.—E. L. BATES: *Fire-resisting Glazing for Windows and the like.*

This relates to a fire-resisting casement consisting of an outer frame of single or double channel bars, in combination with double channel cross-bars mortised together with solder so that one bar passes completely through the other bar and having their flanges tongued into the web of the outer frame bars, and a series of glass sections held within the flanges of the channelled bars.

26,725 of 1905.—R. T. FORD, E. PESTER, F. J. WALTON, and R. H. VOLCKMAN: *A Device for making Joints between the ends of Pipes for Drains and the like.*

This relates to a device for making joints between the ends of pipes for drains and the like, consisting of a thimble having a socket at its upper end with a conical base which receives the lower correspondingly bevelled end of the water pipe, a metal joint being made round it in the socket, the lower end of the socket being reduced to the diameter of the upper pipe and carried down for a sufficient distance in the lower pipe, the upper end of which is attached by a metal or plumber's joint to the outside of the socket.

4,918 of 1906.—E. COFFIN: *Tiles.*

This relates to a tile in the shape of a lozenge having on its upper surface a rib and a groove parallel and adjacent to each upper edge of the lozenge, and having on the end surface a groove parallel and adjacent to each lower edge of the lozenge, so that when laid on the roof the tiles partially cover each other and the grooves on the under surface take over the right half rib and the left half rib respectively of the two tiles which lie below it, and also form with the grooves on the upper surface of the tiles below a closed channel or passage; such tile being also provided with holes upon lateral ears for fixing outside the said grooves, thus preventing access of water through the said holes or grooves and at the same time permitting perfect drainage without penetration.

22,643 of 1905.—W. J. SWAIN: *A Tubular Latch and Lock.*

This invention consists of an improved construction of mortise latch which is made tubular in shape so that it can be fixed in the thinnest door as an ordinary mortise latch, by drilling a hole of the required diameter and length, without the use of chisels.

2,872 of 1906.—W. NEWMAN & SONS, LTD., and H. G. NEWMAN: *A Panic or Emergency Latch for Doors and the like.*

This relates to a panic latch or bolt employed in conjuncton with a crush bar, co-operative latch or lock fastening mechanisms, said mechanisms being selectively and independently operated either by the said crush bar or by a handle or knob.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

4,916 of 1906.—W. B. JENKINS: *Ridging Tiles.*

This relates to ridging tiles for roofs and like purposes and is characterised by the provision of projecting flanges, ridges, or their equivalents and corresponding sockets or recesses.

4,478 of 1906.—H. ODENBACH: *Adjustable Platform Apparatus for Cleaning the Outside of Windows.*

This relates to a window cleaning platform having downwardly and outwardly sloping feet which are adjustably arranged on uprights by bolt and slot connexions for the purpose of compensating for the difference in height between the outer and inner sill.

5,783 of 1906.—J. P. COMSTOCK: *Window Frames.*

This relates to a window frame and consists of a sash or transom bar formed of angle irons secured back to back with distance pieces between them and secured to the window frame by means of plates located between the said irons and provided with a foot whereby it is secured to the window frame.

2,102 of 1906.—C. E. CHALLIS: *Device for Suspending and Supporting Curtains and the like.*

This relates to a device for suspending curtains and the like. A cord or rod is used for supporting the curtain, and is usually a helix of wire which passes through the hem of the curtain, but is somewhat shorter when unextended than the space it is intended to span. Into each end of the helix is inserted a screwed pin having the same pitch as the helix and terminating in a ball or knob or equivalents of somewhat larger diameter than the outside of the helix. The knobs fit in cupped recesses in plates or their equivalents which are slotted to pass the helix but retain the knobs; the plates are attached to the window sash or the like or the ends of the helix may be inserted into hollowed balls and fixed there by soldering or otherwise or the ends of the helix may be inserted in tubes, preferably with closed outer ends and be retained there by pressing the groove or tongue, by means of a suitable tool, in each tube, these grooves displace certain coils of the helix and engage with others, and so retain the ends, the grooves further serve as sockets in which hooks inserted in the window frame or the like engage when the device is erected, or the tube may terminate in a ball or the like and fit in a socket.

PUBLISHER'S NOTICES.

Nat. Tel., 6112 Gerrard. Telegrams, "The Builder, London."

THE INDEX (with TITLE-PAGE) for VOLUME XC. (January to June, 1906) was given as a supplement with the issue for July 14.

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PREPAYMENT IS ABSOLUTELY NECESSARY.

. Stamps must not be sent, but all sums should be remitted by Postal Orders, payable to J. MORGAN, and addressed to the Publisher of "THE BUILDER," Catherine Street, W.C.

Advertisements for the current week's issue are received up to HALF-PAST ONE p.m. on THURSDAY, but "Classification" is impossible in the case of any which may reach the Office after HALF-PAST TWELVE p.m. on that day. Those intended for the Outside Wrapper should be in by TWELVE NOON on WEDNESDAY.

ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY MORNING.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, etc., left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

ADVERTISERS in "THE BUILDER" may have *Replies addressed to the Office*, Catherine Street, Covent Garden, W.C., *free of charge*. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage. Unused stamps are returned to advertisers the week after publication.

N.B.—The Reply Boxes are not intended for trade lists, circulars, and the like; should these be received, they cannot (if noticed) be forwarded.

AN EDITION Printed on THIN PAPER, for FOREIGN and COLONIAL CIRCULATION, is issued every week.

READING CASES { NINEPENCE EACH. By post (carefully packed) 1s.

MEETING.

SATURDAY, AUGUST 18.

Northern Architectural Association.—An Excursion Meeting. Members to assemble at Jesmond Church (adjoining the tram lines from Central Station) at 3 p.m., and proceed to the new Grammar School. After inspecting the school, the new wing, etc., of the Medical College will be visited.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

August 2.—By DRIVER, JONAS, & CO. (at Ross).
Welsh Newton, Hereford.—Portions of the Pembridge Castle Estate, 600 acres, f. (in lots) £7,264

By PERKINS & SONS (at Southampton).
Southampton.—Howard-rd., f.g. rents 222*l.* 13s. 0d., reversion in 976 yrs. (in lots). 5,410

By VENTON, BULL, & COOPER (at Winchester House).
St. John's Wood.—2, Hall-rd., u.t. 10 yrs., g.r. 50*l.*, y.r. 300*l.* 1,500
Dalston.—213 and 215, Dalston-la., f., y.r. 74*l.* 1,090

August 3.—By DRIVER, JONAS, & CO. (at Leominster).
Leominster, Hereford.—Upper and Lower Nicholson Farm, 258 a. 3 r. 13 p., f., y.r. 180*l.* 4,100

August 8.—By LEEDER & SIMS (at Neath).
Neath, Glamorgan.—9, Wind-st. (s.), area 8,982 ft., f., y.r. 110*l.* 2,300
11, Green-st. (s.), area 1,836 ft., f., y.r. 65*l.* .. 2,390

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. beerhouse; p.h. for public-house; o. for office; s. for shops; ct. for court.

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to read and consider articles offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

PRICES CURRENT OF MATERIALS.

. Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.	
Hard Stocks	1 10 0	per 1000 alongside, in river.
Rough Stocks and Grizzles	1 7 0	" " "
Picked Stocks for Facings	2 17 6	" delivered.
Flettons	1 8 0	" at railway depôt.
Red Wire Cuts	1 14 0	" " "
Best Fareham Red	3 12 0	" " "
Best Red Pressed Ruabon Facing	5 0 0	" " "
Best Blue Pressed Staffordshire	3 15 0	" " "
Do. Bullnose	4 0 0	" " "
Best Stourbridge Fire Bricks	3 14 0	" " "

GLAZED BRICKS.

Best White and Ivory Glazed Stretchers	12	0	0	" " "
Headers	11	0	0	" " "
Quoins, Bullnose, and Flats	16	0	0	" " "
Double Stretchers	19	0	0	" " "
Double Headers	16	0	0	" " "
One Side and two Ends	19	0	0	" " "
Two Sides and one End	20	0	0	" " "
Splays, Chamferred, Squints	26	0	0	" " "
Best Dipped Salt Glazed Stretchers, and Header	12	0	0	" " "
Quoins, Bullnose, and Flats	14	0	0	" " "
Double Stretchers	15	0	0	" " "
Double Headers	14	0	0	" " "
One Side and two Ends	15	0	0	" " "
Two Sides and one End	15	0	0	" " "

BRICKS, &c. (*continued*).

GLAZED BRICKS (*continued*)—

	£ s. d.	
Splays, Chamferred, Squints	14 0 0	per 1000, at railway depôt.
Second Quality White and Dipped Salt Glazed	2 0 0	" less than best.

	s. d.	
Thames and Pit Sand	7 0	per yard, delivered.
Thames Ballast	5 6	" "
Best Portland Cement	27 0	per ton, "
Best Ground Blue Lias Lime	19 0	" "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 11s. 6d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dpt.

STONE

	s. d.	
BATH STONE—delivered on road waggons, Paddington Depôt	1 6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt	1 8½	" "

PORTLAND STONE (20 ft. average)—

Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 1	"	"
White Basebed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 2½	"	"

	s. d.		
Ancaster in blocks	1 10	per ft. cube, deld. rly. depôt.	
Beer "	1 6	"	"
Greenshill "	1 10	"	"
Darley Dale in blocks	2 4	"	"
Red Corsehill "	2 2	"	"
Closeburn Red Freestone	2 0	"	"
Red Mansfield "	2 4	"	"

YORK STONE—*Robin Hood Quality.*

Scappled random blocks	2 10	"	"
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3	per ft. super.,	"
6 in. rubbed two sides ditto, ditto	2 6	"	"
3 in. sawn two sides slabs (random sizes)	0 11½	"	"
2 in. to 2½ in. sawn one side slabs (random sizes)	0 7½	"	"
1½ in. to 2 in. ditto, ditto	0 6	"	"

HARD YORK—

Scappled random blocks	3 0	per ft. cube,	"
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 8	per ft. super.,	"
6 in. rubbed two sides ditto	3 0	"	"
3 in. sawn two sides slabs (random sizes)	1 2	"	"
2 in. self-faced random flags	0 5	"	"

	s. d.	
Hopton Wood (Hard Bed) in blocks	2 0	per ft. cube, deld. rly. depôt.
" " " 6 in. sawn both sides landings	2 7	per ft. super. deld. rly. depôt.
" " " 3 in. sawn both sides random slabs	1 0	" "
" " " 2 in. do.	0 8½	" "

SLATES.

In. In.	£ s. d.	
20×10 best blue Bangor	13 2 6	per 1000 of 1200 at r. d.
20×12 " "	13 17 6	" "
20×10 first quality "	13 0 0	" "
20×12 " "	13 15 0	" "
16×8 " "	7 5 0	" "
20×10 best blue Portmadoc	12 12 6	" "
16×8 " "	6 12 6	" "
20×10 best Eureka unfading green	15 17 6	" "
20×12 " "	18 7 6	" "
18×10 " "	13 5 0	" "
16×8 " "	10 5 0	" "
20×10 permanent green	11 12 6	" "
18×10 " "	9 12 6	" "
16×8 " "	6 12 6	" "

TILES.

	s. d.	
Best plain red roofing tiles	42	0 per 1000 at rly. depôt.
Hip and Valley tiles	3	7 per doz. "
Best Broseley tiles	50	0 per 1000 "
Do. Ornamental tiles	52	6 " "
Hip and Valley tiles	4	0 per doz. "
Best Ruabon red, brown, or brindled do. (Edwards)	57	6 per 1000 "
Do. Ornamental do.	60	0 " "
Hip tiles	4	0 per doz. "
Valley tiles	3	0 " "
Best Red or Mottled Staffordshire do. (Peakes)	51	9 per 1000 "
Do. Ornamental do.	54	6 " "
Hip tiles	4	1 per doz. "
Valley tiles	3	8 " "
Best "Rosemary" brand plain tiles	48	0 per 1000 "
Best Ornamental tiles	50	0 " "
Hip tiles	4	0 per doz. "
Valley tiles	3	8 " "
Best "Hartshill" brand plain tiles, sand-faced	50	0 per 1000 "
Do pressed	47	6 " "
Do. Ornamental do.	50	0 " "
Hip tiles	4	0 per doz. "
Valley tiles	3	6 " "

WOOD.

BUILDING WOOD.	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	13 10 0	... 15 0 0
Deals: best 3 by 9	13 0 0	... 14 0 0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11 0 0	... 12 0 0
Battens: best 2½ by 6 and 3 by 6	0 10 0	less than 7 in. and 8 in.

WOOD (continued).

BUILDING WOOD (continued)—	At per Standard. £ s. d.	£ s. d.
Deals: seconds	1 0 0	less than best.
Battens: seconds	0 10 0	" " 0
3 in. by 4 in. and 3 in. by 6 in.	9 0 0	... 10 0 0
3 in. by 4½ in. and 2 in. by 5 in.	8 10 0	... 9 10 0
Foreign Sawn Boards—		
1 in. and 1¼ in. by 7 in.	0 10 0	more than battens.
1½ in.	1 0 0	"
	At per load of 50 ft.	
Fir timber: best middling Danzig or Memel (average specification)	4 10 0	... 5 0 0
Seconds	4 0 0	... 4 10 0
Small timber (8 in. to 10 in.)	3 12 6	... 3 15 0
Small timber (6 in. to 8 in.)	3 0 0	... 3 10 0
Swedish balks	2 10 0	... 3 0 0
Pitch-pine timber (30 ft. average)	4 0 0	... 4 15 0
JOINERS' WOOD.	At per standard.	
White Sea: first yellow deals, 3 in. by 11 in.	24 0 0	... 25 0 0
3 in. by 9 in.	22 0 0	... 23 0 0
Battens, 2½ in. and 3 in. by 7 in.	6 10 0	... 18 0 0
Second yellow deals, 3 in. by 1 in.	18 10 0	... 20 0 0
3 in. by 9 in.	17 10 0	... 19 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	... 14 10 0
Third yellow deals, 3 in. by 11 in. and 9 in.	13 10 0	... 15 0 0
Battens, 2½ in. and 3 in. by 7 in.	11 0 0	... 12 0 0
Petersburg first yellow deals, 3 in. by 11 in.	21 0 0	... 22 10 0
Do. 3 in. by 9 in.	18 0 0	... 19 10 0
Battens	13 10 0	... 15 0 0
Second yellow deals, 3 in. by 11 in.	16 0 0	... 17 0 0
Do. 3 in. by 9 in.	14 10 0	... 16 0 0
Battens	11 0 0	... 12 10 0
Third yellow deals, 3 in. by 11 in.	13 0 0	... 14 0 0
Do. 3 in. by 9 in.	12 10 0	... 14 0 0
Battens	10 0 0	... 11 0 0
White Sea and Petersburg—		
First white deals, 3 in. by 11 in.	14 10 0	... 15 10 0
" " 3 in. by 9 in.	13 10 0	... 14 10 0
Battens	11 0 0	... 12 0 0
Second white deals, 3 in. by 11 in.	13 10 0	... 14 10 0
" " 3 in. by 9 in.	12 10 0	... 13 10 0
" " battens	10 0 0	... 11 0 0
Pitch-pine: deals	18 0 0	... 21 0 0
Under 2 in. thick extra	0 10 0	... 1 0 0
Yellow Pine—First, regular sizes	44 0 0	upwards.
Oddments	32 0 0	"
Seconds, regular sizes	33 0 0	"
Yellow Pine oddments	28 0 0	"
Kauri Pine—Planks, per ft. cube	0 3 6	... 0 5 0
Danzig and Stettin Oak Logs—		
Large, per ft. cube	0 3 0	... 0 3 6
Small " "	0 2 6	... 0 2 9
Wainscot Oak Logs, per ft. cube	0 5 6	... 0 6 0
Dry Wainscot Oak, per ft. sup. as inch	0 0 8½	... 0 0 9½
1 in. do. do	0 0 7	... —
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0 0 9	... 0 1 0
Selected, Figury, per ft. super. as inch	0 1 6	... 0 2 6
Dry Walnut, American, per ft. super. as inch	0 0 10	... 0 1 0
Teak, per load	17 0 0	... 22 0 0
American Whitewood Planks, per ft. cube	0 4 0	... 0 5 0
Prepared Flooring, etc.—	Per square.	
1 in. by 7 in. yellow, planed and shot	0 13 6	... 0 17 6
1 in. by 7 in. yellow, planed and matched	0 14 0	... 0 18 0
1¼ in. by 7 in. yellow, planed and matched	0 16 0	... 1 0 0
1 in. by 7 in. white, planed and shot	0 12 0	... 0 14 6
1 in. by 7 in. white, planed and matched	0 12 6	... 0 15 0
1¼ in. by 7 in. white, planed and matched	0 15 0	... 0 16 6
½ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0 11 0	... 0 13 6
1 in. by 7 in. " "	0 14 0	... 0 18 0
¼ in. by 7 in. white " "	0 10 0	... 0 11 6
1 in. by 7 in. " "	0 12 9	... 0 15 0
6 in. at 6d. to 9d. per square less than 7 in.		

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	7 0 0	... 7 10 0
Compound Girders, ordinary sections	9 0 0	... 10 0 0
Steel Compound Stanchions	12 0 0	... 13 0 0
Angles, Tees, and Channels, ordinary sections	9 0 0	... 10 0 0
Flitch Plates	9 0 0	... 10 0 0
Cast Iron Columns and Stanchions including ordinary patterns	7 10 0	... 8 10 0

METALS.

IRON—	Per ton, in London. £ s. d.	£ s. d.
Common Bars	8 0 0	... 8 10 0
Staffordshire Crown Bars, good merchant quality	8 10 0	... 9 0 0
Staffordshire "Marked Bars"	10 10 0	... —
Mild Steel Bars	8 15 0	... 9 0 0
Hoop Iron, basis price	9 5 0	... 9 10 0
" " Galvanised	17 0 0	... —
(*And upwards, according to size and gauge.)		
Sheet Iron Black—		
Ordinary sizes to 20 g.	9 10 0	... —
" " 24 g.	10 10 0	... —
" " 26 g.	12 0 0	... —
Sheet Iron, Galvanised, flat, ordinary quality—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	14 0 0	... —
Ordinary sizes to 22 g. and 24 g.	14 10 0	... —
" " 26 g.	15 0 0	... —
Sheet Iron, Galvanised, flat, best quality—		
Ordinary sizes to 20 g.	17 0 0	... —
" " 22 g. and 24 g.	17 10 0	... —
" " 26 g.	19 0 0	... —
Galvanised Corrugated Sheets—		
Ordinary sizes 6 ft. to 8 ft. 20 g.	14 0 0	... —
" " 22 g. and 24 g.	14 10 0	... —
" " 26 g.	15 15 0	... —

METALS (continued).

IRON (continued)—	Per ton, in London. £ s. d.	£ s. d.
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	11 10 0	... —
Best Soft Steel Sheets, 22 g. & 24 g.	12 10 0	... —
" " " 26 g.	14 15 0	... —
Cut Nails, 3 in. to 6 in.	9 10 0	... 9 15 0
(Under 3 in., usual trade extras.)		

LEAD, &c.

	Per ton, in London. £ s. d.	£ s. d.
LEAD—Sheet, English, 3lb. and up.	19 7 6	... —
Pipe in coils	19 17 6	... —
Soil pipe	20 7 6	... —
Compo pipe	20 7 6	... —
ZINC—Sheet—		
Vieille Montagne ton	33 0 0	... —
Silesian	32 15 0	... —
COPPER—		
Strong Sheet per lb.	0 1 1	... —
Thin " "	0 1 2	... —
Copper nails "	0 1 0	... —
BRASS—		
Strong Sheet "	0 1 0	... —
Thin " "	0 1 1	... —
TIN—English Ingots "	0 1 9	... —
SOLDER—Plumbers' "	0 0 8½	... —
Tinmen's "	0 0 10½	... —
Blowpipe "	0 0 11½	... —

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

15 oz. thirds	2½d. per ft. delivered.
" fourths	1¾d. " "
21 oz. thirds	3½d. " "
" fourths	2½d. " "
26 oz. thirds	4½d. " "
" fourths	3½d. " "
32 oz. thirds	5d. " "
" fourths	4½d. " "
Fluted Sheet, 15 oz.	3½d. " "
" 21 oz.	4½d. " "

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

¼ Hartley's	2½d. per ft. delivered.
⅜ "	2½d. " "
½ "	3d. " "
Figured and Oxford Rolled "Oceanic" Glass, white	4d. " "
Do. " tinted	5½d. " "

OILS, &c.

		£ s. d.
Raw Linseed Oil in pipes	per gallon	0 1 10
" " " in barrels	"	0 1 11
" " " in drums	"	0 2 1
Boiled " " in pipes	"	0 2 0
" " " in barrels	"	0 2 1
" " " in drums	"	0 2 3
Turpentine in barrels	"	0 3 8
" in drums	"	0 3 10
Genuine Ground English White Lead	per ton	22 10 0
Red Lead, Dry	"	21 10 0
Best Linseed Oil Putty	per cwt.	0 7 0
Stockholm Tar	per barrel	1 12 0

VARNISHES, &c.

	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0
Superfine Hard-drying Oak, for seats of Churches	0 14 0
Fine Elastic Carriage	0 12 6
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 16 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Eggshell Flatting Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 6
Berlin Black	0 16 0
Knotting	0 10 0
French and Brush Polish	0 10 0

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied **DIRECT** from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum (52 numbers) **PREPAID.** To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, etc., 26s. per annum.

Remittances (payable to J. MORGAN) should be addressed to The Publisher of "THE BUILDER," Catherine-street, W.C.

SUBSCRIBERS in LONDON and the SUBURBS, by prepaying at the Publishing Office 19s. per annum (52 numbers) or 4s. 9d. per quarter (13 numbers), can ensure receiving "The Builder" by *Friday Morning's Post.*

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

BANDON.—For alterations and additions to the Munster and Leinster Bank, Bandon. Mr. Arthur Hill, B.E., F.R.I.B.A., M.R.I.A., 22, George's-street, Cork. Quantities by Mr. W. Butler, Dublin:—

D. Murphy	£1,306 0	W. O'Connell & Co.	£1,043 7
D. Hegarty	1,200 0		
E. & P. O'Flynn	1,135 0	S. Hill, Cork*	1,020 0
T. O. Mahony	1,120 0		

BARROW-IN-FURNESS.—For the erection of two cottages in Buccleuch-street, for the Abattoir attendant, for the Corporation. Quantities by Borough Engineer and Surveyor:—

Clark & Robinson	£530 0	T. Brown	£515 0
Rainey Bros.	530 0	H. Britton†	505 15

[All of Barrow-in-Furness.]

[† Recommended to Council for acceptance.]

BECKENHAM.—For widening Bromley-road (The Knoll), for a length of 300 ft., for the Urban District Council. Mr. J. A. Angell, Surveyor, Beckenham:—

F. Hoffmann	£1,194 1 11	E. E. Iles	£979 2 8
F. & G. Foster	1,031 0 0	Mowlem & Co., Westminster*	949 0 0
H. Woodham & Sons	1,023 18 3		

BECKENHAM.—For the erection of extensions to and the modernisation of the boys', girls', and infants' department of the Public Elementary Schools, Bromley-road, for the Urban District Council. Mr. J. A. Angell, Surveyor:—

S. G. Gee	£7,676 0	J. Lonsdale	£5,651 0
H. Heathfield	6,121 0	F. & G. Foster	5,591 0
B. E. Nightingale	5,967 0	J. & C. Bowyer	5,555 0
F. W. Green	5,893 10	Hawkey & Oldman, Mile End, E.*	5,465 0
Jones & Andrews	5,798 0		
T. Cromley & Son	5,683 0		

BOTHALHAUGH.—For erecting an entrance lodge, for the Hon. and Rev. W. C. Ellis. Mr. L. A. Loades, architect and surveyor, Morpeth:—

Waterston & Sons	£919 0 0	T. Field	£750 18 4
G. & C. Haswell	887 13 7	Gordon Bros., Choppington*‡	688 15 0
M. Routledge	858 0 0	P. Cuthbert	680 0 0
R. Carse & Son	780 0 0		

‡ Gates not included.

BURNHAM (Somerset).—For suction gas plant, gas-engine and treble rain pump for waterworks, for the Urban District Council. Mr. W. H. Chowins, Waterworks Engineer, Manor-gardens, Burnham:—

T. Mathews	£1,475	Campbells, Ltd.	£752
Worthingtons, Ltd.	967	National Engine Co.	750
Hayward, Tyler, & Co.	821	Tangyes, Ltd., Birmingham*	720
Mather & Sons	795	Scott & Mountain	713
Glenfield & Kennedey	790	Excelsior Co.	712
Christy & Norris	787	F. Bud & Co.	705
Lee, Howle, & Co.	780	Waller & Son	625
Pollock, Whyte, & Co.	773	Daniels & Co.	580
Watt & Co.	769	J. Hitchen & Son	545
Crossleys, Ltd.	761		

CAERAU.—For painting and glazing at Infectious Diseases Hospital, for Llandaff and Dinas Powis Rural District Council. Mr. J. H. James, architect, 18, Quay-street, Cardiff:—

Gough Bros.	£493 10 0	W. J. Gardiner	£382 10 0
F. Bond	482 10 0	W. Williams	370 6 1½
Hatherleigh & Co.	464 11 6	J. H. Mildon	374 8 5½
Knox & Wells	460 19 2	Cooper Bros.	366 5 4
G. W. Sheppard	430 7 10	H. W. North, Canton, Cardiff*	360 2 11
W. Cox	422 5 0		
J. H. Bram	392 1 9	E. R. Bradbury	350 5 11

CARDIFF.—For painting and renovating East Moors, Roath, and Cathays Police Stations, for the Corporation. Mr. W. Harpur, City Engineer, Town Hall, Cardiff:—

—	East Moors. £ s. d.	Roath. £ s. d.	Cathays. £ s. d.
Cooper Bros., Cardiff*	17 5 0	14 7 0	26 15 0
Gough Bros	17 6 9	15 5 0	27 3 2
G. Hallett	18 4 6	17 8 6	27 4 10
W. H. Colley	19 0 0	16 10 0	28 10 0
D. R. Bradbury	19 18 6	20 11 0	36 13 9
Chorley & Co.	22 14 0	18 10 0	30 19 6
W. J. Gardiner	24 0 0	19 0 0	39 0 0
W. & S. Collis	24 11 11	21 11 0	38 14 11
S. H. Mildon	28 10 6	23 8 0	36 8 0
R. Lewis & Co.	26 12 0	26 10 6	35 9 3
F. G. Robbins	37 3 6	23 8 0	47 18 6
W. Davis & Son	38 10 0	28 2 0	66 16 6
C. Marshall	47 17 6	29 12 6	56 12 6
H. W. North	24 0 0	27 0 0	—
J. H. Brain	—	—	39 7 6
Parr Bros.	—	—	66 8 0

CUCKFIELD.—For lining filters at Balcombe Waterworks with bitumen sheeting, etc., for the Rural District Council. Mr. D. Rankine, Waterworks Engineer, Hayward's Heath:—

J. Young	£280 0 0	R. Cook & Sons, Crawley*	£239 0 0
Hardy, Bate, & Co.	275 0 0	The Asphaltic Limestone Concrete Co.‡	111 10 3
G. M. Callendar & Co.	275 0 0		

‡ For sheeting only.

CWMDU.—For rebuilding nave and restoring the tower of the Parish Church of St. Michael, Cwmdu, near Crickhowell, for the Rev. R. Lewis Morgan. Messrs. Hunt & Baldwin, architects, 4, Warren-street, Stockport. Quantities by the architects:—

T. D. Evans	£1,800 0 0	H. Smith	£1,467 0 0
R. Edwards	1,641 0 0	J. C. Evans	1,466 19 0
Walters & Sons	1,640 4 1	W. Morgan, Crickhowell‡	1,349 1 9
Morgan Bros.	1,546 0 5		

‡ No credit calculated for old timber.

ERDINGTON.—For making a new road at Erdington, near Birmingham. Messrs. W. Parrott & Antrobus, surveyors, 19, Colmore-row, Birmingham:—

Harrison & Co.	£2,642 18 0	Currall, Lewis, & Martin, Ltd.	£1,588 0 0
A. Jewell	1,798 13 7	G. Law	1,522 11 3
Smedley & Booth	1,740 0 0	J. White, jun., Handsworth, Birmingham*	1,455 5 1
Sutherland & Thorpe	1,622 13 0		

GOSFORTH.—For road-widening, etc., South Gosforth Council school, for the Urban District Council. Mr. G. Nelson, Engineer and Surveyor, Council Chambers, High-street, Gosforth:—

J. W. Lant	£432 0 9	W. Robson	£379 0 0
Donald Bros.	409 0 0	W. C. Fleck*	343 15 9
J. Thompson	399 10 0		

[All of Gosforth.]

GOSPORT.—For the reconstruction of No. 5, North-street, and 62, King-street, for Mr. F. G. Nobes. Mr. E. J. Thomas, F.A.S.I., surveyor, 26, High-street, Gosport:—

J. Croad	£545 0	C. M. Dash	£457 0
T. B. Gibbons	502 17	Middleton & Co., Ltd.	445 0
C. J. Lear & Son	498 0	J. Hunt*	437 0
R. W. Lowe	492 0		

[All of Gosport.]

HARROGATE.—For private street works required in back roads off Studley-road and back road on west side of Harrogate Hotel, Starbeck, for the Corporation. Mr. F. Bagshaw, Borough Engineer and Surveyor, Harrogate:—

Back Roads off Studley-road.

C. H. Dickinson, Forest-lane, Starbeck, Harrogate* £166 17 0

Back Road on West Side of Harrogate Hotel, Starbeck.

J. Lee & Sons, 16, Omega-terrace, New Park, Harrogate* £69 12 6

HIPPERHOLME.—For constructing main pipe sewers, Syke Lane Valley, for the Urban District Council. Mr. F. Mawle, engineer, Tetley House, Kirkgate, Wakefield:—

W. Doleman, Dewsbury £1,721 8 10

HOLYHEAD.—For additions and alterations to the C.M. Chapel, Llaingoch. Mr. J. Owen, F.R.I.B.A., Exchange-chambers, Holyhead:—

R. Morris	£1,082	W. Roberts	£986
J. S. Parry & T. & R. Owen	1,080		

KIRTON.—For the erection of a villa residence at Kirton, near Boston:—

J. Comen	£299 10	S. Parker & Son, Wainfleet, Lincs*	£269 0
T. H. Cade	289 19		
J. Longley & Son, Ltd.	275 0		

LEE-ON-SOLENT.—For the erection of workshops, engine-house, etc., at Seafield Park College. Mr. N. Atkers, architect, 62, West-street, Fareham:—

J. Cockerell	£683 0 0	R. Willcox	£628 0 0
C. Newbury	660 0 0	J. Hunt	595 15 0
A. H. Tubbeck..	658 10 6	G. Dawse & Son	595 0 0
Lane Bros.	650 0 0	C. Conway	590 0 0
W. Latty	644 0 0	H. Plummer ..	559 14 0
C. M. Dash	629 0 0		

LONDON.—For rebuilding No. 33, Fish Street-hill, E.C. Messrs. McKillium & Procter, architects, 83, St. Paul's Churchyard, London, E.C. Quantities by the architects:—

		Time, Months.
J. Cannon	£1,418 17 6	7
H. J. Green & Co.	1,380 0 0	3½
Battley, Sons, & Holmes	1,335 0 0	4
T. Lapthorne & Co.	1,278 0 0	3½
J. Greenwood & Co.	1,229 0 0	4½
Braid, Pater & Co.	1,226 0 0	3
Peacock Bros.*	1,217 0 0	3
Courtney & Fairbairn....	1,200 0 0	4

[Architects' estimate, £1,200.]

LOSSIEMOUTH SCHOOLS (N.B.).—Accepted for (1) new latrines, (2) relaying and extending drain system, (3) levelling and gravelling playgrounds, (4) new seating. Mr. Robert B. Pratt, A.R.I.B.A., Architect and Surveyor, Town and County Bank-buildings, Elgin:—

Mason: W. Christie, Lossiemouth.....
Carpenter: Ritchie & Son, Lossiemouth
Seating: M. Andrew & Son, Aberdeen .. } £193
Plumber: J. Ross, Elgin .....
Slater: Thompson & Fraser, Elgin ....
Painter: W. F. Smith, Lossiemouth....
Playgrounds: W. Falconer, Elgin .....

The sanitary fittings are from Adam & Co., Scotswood-on-Tyne.

LYME REGIS (Dorset).—For erecting an hotel adjoining the railway-station, for the Directors of Messrs. Mitchell, Toms, & Co., Ltd. Mr. A. W. Yeoman, F.R.I.B.A., Cornhill, Chard:—

Westcott, Austin, & White	£2,472 0 0	C. Turner ..	£2,053 2 10
F. J. Clarke..	2,389 10 0	J. W. & H. Childs	2,047 0 0
Birt & Pippard	2,196 0 0	A. & F. Wiscombe	2,031 0 0
F. W. Crabb	2,155 0 0	W. Caddy ..	1,998 10 0
H. Pittard & Son	2,100 0 0	A. Poole	1,896 0 0
H. J. Spiller & Son	2,060 0 0	Parsons Bros. & Dunster	1,866 0 0
		Harris & Wortcott, Chard*	1,860 0 0

NEW HUNSTANTON.—For making-up part of Northgate, for the Urban District Council:—

R. Shanks.....	£285	F. Southgate, Hunstanton*	£266

NORWICH.—For supply of 100,000 creosoted red deal paving blocks, for the Corporation. Mr. A. E. Collins, City Engineer, etc., Guildhall, Norwich:—

Acme Flooring and Paving Co. (1904), Ltd., Gainsborough-road, Victoria Park, London, N.E.* £5 1 9

NOTTINGHAM.—For completion of church, Lady Bay, West Bridgford. Messrs. A. R. Calvert and W. R. Gleave, architects, 18, Low-pavement, Nottingham:—

G. T. Lovett* £776

[Lowest of four tenders.]

OAKBANK (Whitehaven).—For the erection of a dwelling-house at Oakbank, for Mr. Fergus Watson. Mr. J. S. Stout, architect, 36, Lowther-street, Whitehaven:—

Mason: J. Young, Catherine-street, Whitehaven	£300 18 8
Joiner: J. Fletcher, Workington	153 11 3
Plumber: W. H. Holloway, Queen-street, Whitehaven	90 0 0
Plasterers: J. Lawson & Sons, Gordon-street, Workington.....	76 2 0
Slater: E. Burrow, Station-road, Workington	39 17 2
Painter: T. W. Peason, Scotch-street, Whitehaven	15 5 0

SEAFORD (Sussex).—For erecting a boarding house, for Seaford West Co. Mr. T. W. B. Blackman, P.A.S.I., 24, Old Steyne, Brighton. Quantities by Mr. H. Curtis Card, Lewes:—

Saunders Bros.	£3,876 0 0	Morling Bros.	£2,972 0 0
T. Rich.....	3,271 5 3	Potter Bros...	2,950 0 0
T. Martin	3,261 10 8	W. Wilkinson	2,889 18 7
E. P. Bulled & Co.	3,209 0 0	T. Lency & Son	2,785 0 0
		Godfrey Bros.	2,772 12 5
W. A. Field & Co.	3,161 0 0	R. Cook & Son	2,694 0 0
		E. Streather, South Croydon*	2,495 14 0
F. T. Webb ..	3,132 1 2		
H. Young	2,998 9 0		

TERRINGTON ST. CLEMENT.—For erecting a dwelling-house at Hay Green, for the Old Stager Lodge of Oddfellows, Lynn. Mr. H. T. Tilson, architect, 16, Railway-road, Lynn:—

H. W. Reeder ..	£255 0 0	J. J. Bone	£200 0 0
Dye & Allen ..	235 0 0	J. Medwell	198 10 0
—. Brummitt ..	210 0 0	J. Warne	197 18 4
Johnson & Son	210 0 0	H. Barnes & Co., Lynn*	190 0 0
Read & Wildbur	209 10 0		

TILBURY DOCK.—For laying 300 yds. of sewers, etc., near Tilbury Dock Station, for Orsett Rural District Council. Mr. S. A. Hill-Willis, Engineer, Council Offices, 2, Orsett-road, Grays. Quantities by engineer:—

E. Catton, jun.	£364 4 5	F. H. White, Tilbury*	£194 0 0
R. J. Mead....	335 11 0	G. Hayward ..	188 15 3
Wilson, Border, & Co.	240 15 0	H. Philbey	181 8 7
Hewitt & Son ..	225 10 0		

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